

PRELIMINARY ASSESSMENT REPORT

**CARD BLANC/CARTER
HOUSTON, TEXAS**

EPA CERCLA I.D. NO.: TXD988061446

Prepared for:

**The United States Environmental Protection Agency
Region VI
1445 Ross Avenue, Suite 1200
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**Contract No.: 68-W9-0015
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Document Control No.: 4603-22-0093**

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15 July 1993

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PRELIMINARY ASSESSMENT

**CARD BLANC/CARTER
HOUSTON, TEXAS**

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15 July 1993

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SECTION 1 INTRODUCTION

Under the authority of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980 and the 1986 Superfund Amendments and Reauthorization Act (SARA), Roy F. Weston, Inc. (WESTON) has completed a Preliminary Assessment (PA) of the Card Blanc/Carter Site (EPA CERCLA Identification Number TXD988061446) located in Houston, Harris County, Texas. The United States Environmental Protection Agency (EPA) Region VI retained WESTON to complete this investigation under EPA Contract Number 68-W9-0015 and Work Assignment Number 22-6JZZ. This document represents the final report for the PA. The purpose of this PA Report is to summarize conditions at the site based on the results of the PA.

1.1 OBJECTIVES OF THE INVESTIGATION

The PA is generally the first screening investigation in a series of site assessments that EPA may complete at a known or potential hazardous waste site that is being investigated under CERCLA/SARA prior to its possible inclusion on the National Priorities List (NPL). The primary objectives of the PA are to:

- Identify known or potential hazardous waste source areas at the site and evaluate the threat that migration or exposure of hazardous substances from the site may pose to human health and the environment; and
- Collect information that can be used to assess the site using EPA's Hazard Ranking System (HRS) to help determine whether further investigation of the site under CERCLA/SARA is warranted to list the site on the NPL.

EPA will use the information obtained from the PA to help prioritize further work for the site. Based on the results, EPA may decide that additional investigation of the site is required or assign a Site Evaluation Accomplished (SEA) status to the site.

1.2 SCOPE OF WORK

The PA is a screening investigation of the site. The PA Scope of Work is focused on characterizing the site through the completion of limited site-related research and site reconnaissance activities. As part of this PA, WESTON performed the following major tasks:

- A site-specific Task Work Plan (TWP) and Health and Safety Plan (HASP) were prepared to provide a detailed plan of action for the PA.
- An onsite reconnaissance was performed to document current site conditions and identify potential sources of hazardous substances at the site. As part of the reconnaissance, a survey of the site's vicinity was completed to identify potential receptors of hazardous substance migration and potential exposure attributable to the site.

- Information concerning the environmental setting of the site was obtained to describe the groundwater, surface water, soil exposure and air pathways.
- Available regulatory compliance files from Federal, State and local government agencies were reviewed, and telephone interviews were conducted with authorities knowledgeable of the site and its surroundings.

1.3 REPORT FORMAT

The PA Report is presented in a format that is intended to facilitate evaluation of the site using the HRS. The report contains the following sections:

- Section 1 - Introduction,
- Section 2 - Site Characteristics,
- Section 3 - Groundwater Pathway,
- Section 4 - Surface Water Pathway,
- Section 5 - Soil Exposure,
- Section 6 - Air Pathway,
- Section 7 - Conclusions, and
- Section 8 - References.

Additional information is provided in appendices following the text of the report. Photographs of the site are provided in Appendix A and copies of the references used as sources of information for the site are provided in Appendix B.

SECTION 2

SITE CHARACTERISTICS

WESTON collected and reviewed available background information regarding the location, description, operational history and regulatory compliance of the site. The discussion in this section of the report is based on this background information, which is referenced throughout the text.

2.1 SITE CHARACTERISTICS

The characteristics of the site are summarized in this following section as follows:

- Site Location,
- Site Ownership,
- Site Description,
- Site Operational History,
- Site Regulatory Compliance History, and
- Nearby Land Use.

2.1.1 Site Location

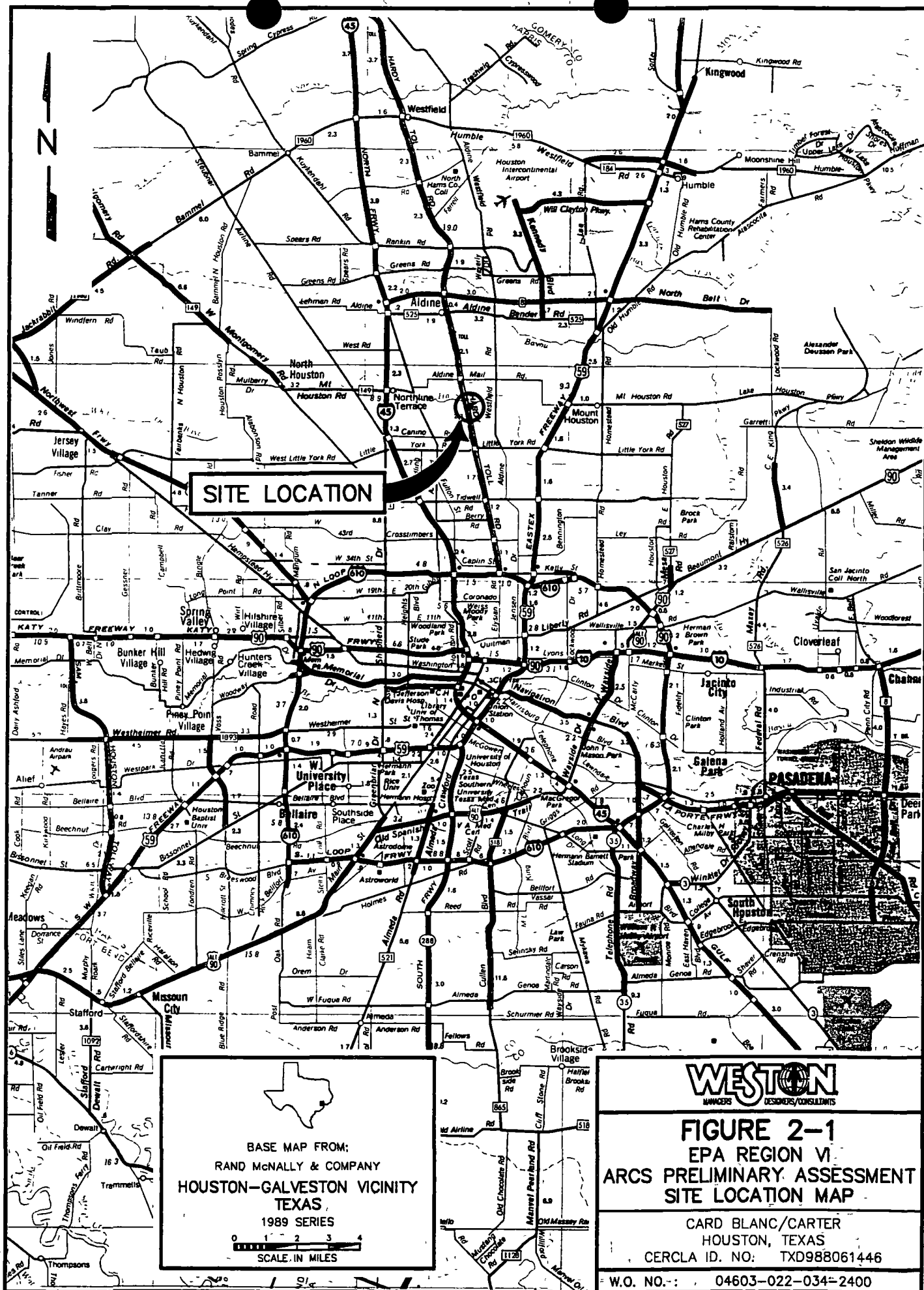
WESTON initially located the site based upon information provided in EPA project files.

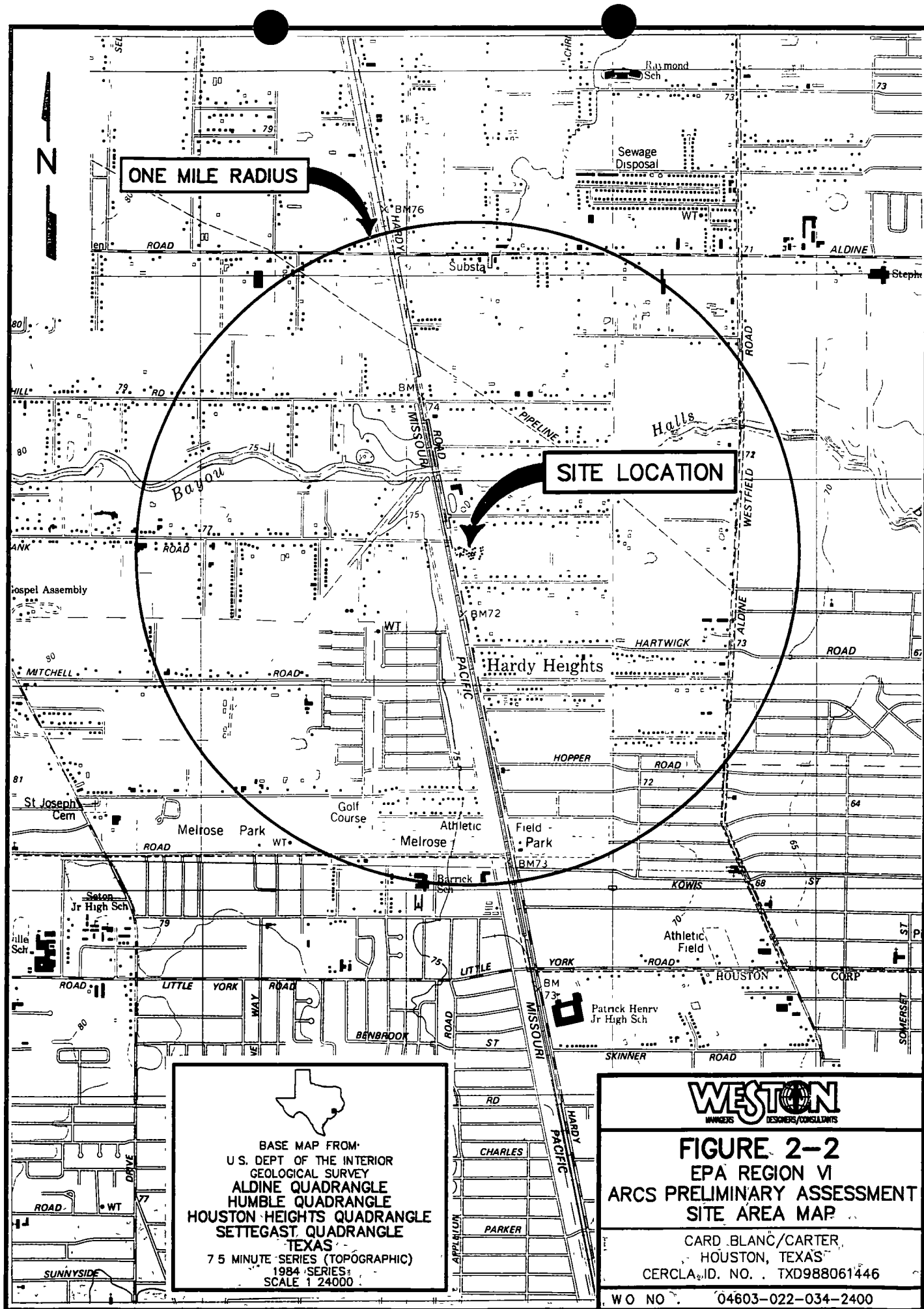
The Card Blanc/Carter (CBC) Site is located at 11532 and 11548 East Hardy Road in Houston, Texas. The site can be accessed by traveling north on Hardy Toll Road from United States (US) Interstate 610. Leave the toll road at the Little York Road exit and the site is located on the right side of East Hardy Road near the intersection of Collins Road. The geographic coordinates of the site are approximately 29°53'19" north latitude and 95°21'54" west longitude (Reference 1). A Site Location Map based on a road map and a Site Area Map based on United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps (Reference 2) are provided as Figures 2-1 and 2-2.

2.1.2 Site Ownership

The CBC Site consists of two adjacent properties: Card Blanc Services of America, Inc. (Card Blanc) located at 11532 East Hardy Road and the Carter property located at 11548 East Hardy Road. The Card Blanc property is owned by Mr. Raymond Dove and the Carter property is owned by Mrs. Estelle Carter.

The Carter property is legally described as Lot twenty-five (25) of HAHN-SITES SUBDIVISION, in the Martin K Snell Survey, in Harris County, Texas (Reference 3). A legal description of the Card Blanc property was not obtained during this PA. It can be assumed that the Card Blanc property is probably in the same subdivision and survey since it is located adjacent to the Carter property but the total number of lots which it occupies is not known.





The Potential Hazardous Waste Site Identification Form (Reference 4) provided to WESTON from EPA did not distinguish between the two properties and indicated that the CBC Site is owned by Mrs. Carter and lists Mr. Dove as the operator. WESTON subsequently contacted Mr. Dove at 11532 East Hardy Road, Houston, Texas 77093 and by phone at (713) 442-8493. He stated that he had the authority to grant site access to both properties, and therefore, a site access letter and an access agreement were then sent to him. Mr. Dove signed the agreement on 15 February 1993 and returned the letter to EPA. Copies of the PA site access letter and access agreement are provided as Reference 5.

WESTON attempted to contact Mr. Dove during the week of 12 May 1993 to arrange a time for the site reconnaissance visit. The phone number was no longer in service and Southwestern Bell informed WESTON that it had been disconnected. WESTON proceeded by conducting a drive-by survey of the site.

WESTON observed that both properties were vacant and that the Card Blanc property had changed names. A sign on the fence along the western side of the Card Blanc property read "R.D. Dove Co., Inc. - Equipment Parts and Rental; 11532 East Hardy; Houston, Texas 77093; (713) 442-8490". WESTON returned to the office and contacted Ms. Stacey Bennett with EPA and informed her of the new information. Ms. Bennett then authorized an offsite reconnaissance of the CBC Site (Reference 6).

2.1.3 Site Description

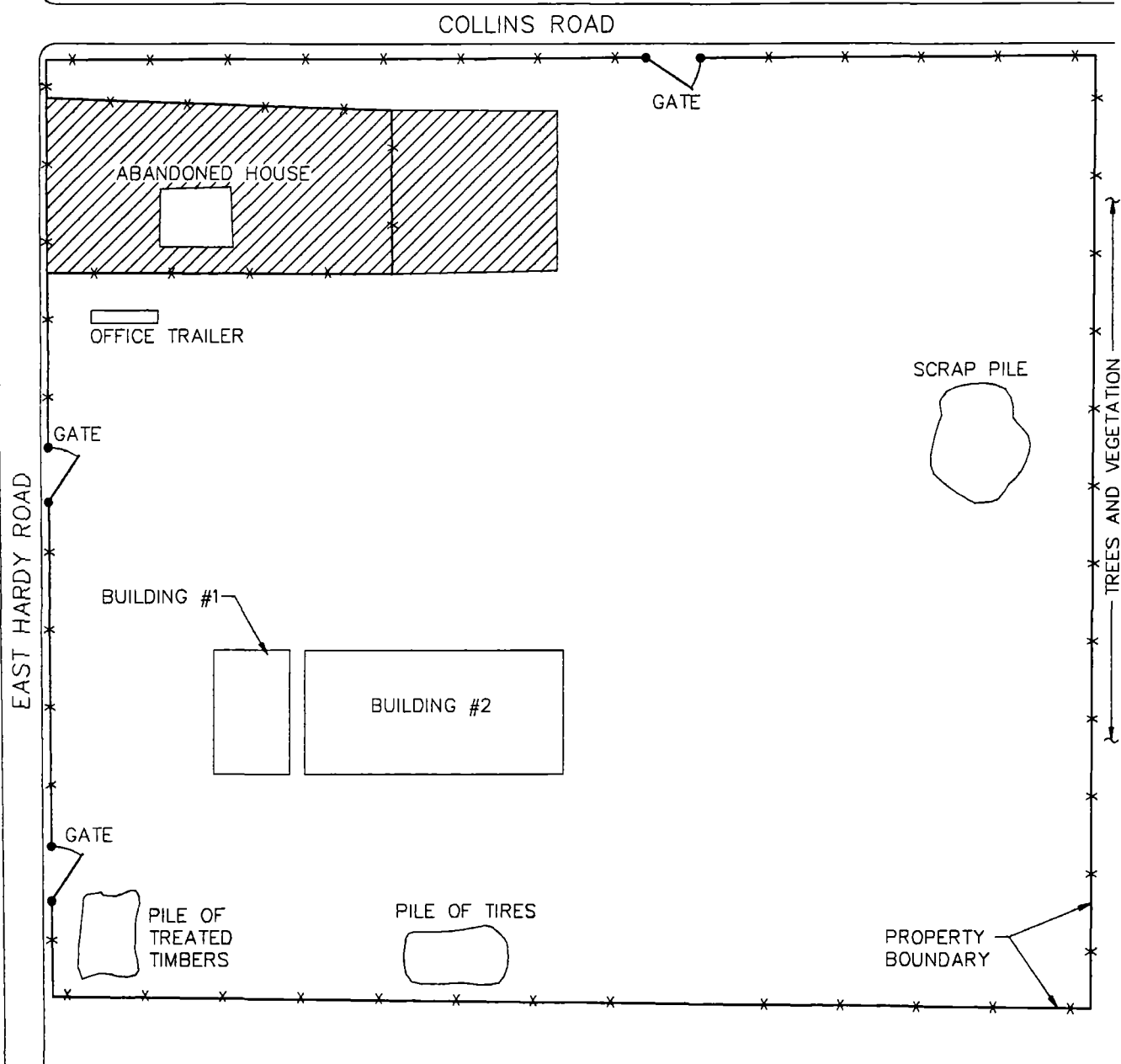
WESTON conducted an offsite reconnaissance on 20 May 1993. WESTON performed the reconnaissance in general accordance with the following:

- WESTON's Generic Preliminary Assessment Work Plan (Document Control No. 4603-22-0006, dated 15 August 1991), and
- The site-specific TWP prepared by WESTON for the site (Document Control No. 4603-22-0051, dated 10 February 1993).

Two WESTON personnel performed the offsite reconnaissance. They interviewed Mrs. and Mr. John Carter at the site, recorded observations in a logbook and on a checklist based on site conditions seen from the site perimeter, and took photographs from the site perimeter to document site conditions. The area surrounding the site was surveyed to identify potential receptors, or targets, of hazardous substance migration from the site. Nearby land use and potential alternative source sites also were documented. Copies of the PA field logbook and Site Reconnaissance Checklist are provided as References 7 and 8. A Site Plan, Figure 2-3, was developed based on observations made during the site visit and information gathered during this PA. Known or potential sources of hazardous substances at the site were identified based on information collected during this PA.

The CBC Site is vacant and can be accessed from three entrances off East Hardy Road and one entrance off Collins Road. The entrances to the Card Blanc property were restricted during the

N



LEGEND

- CARTER PROPERTY
- CARD BLANC PROPERTY
- FENCE

SOURCE:
 FIELD LOGBOOK NOTES (REFERENCE 7)
 RECONNAISSANCE CHECKLIST (REFERENCE 8)

NOT TO SCALE



FIGURE 2-3
 EPA REGION VI
 ARCS PRELIMINARY ASSESSMENT
 SITE PLAN

CARD BLANC/CARTER
 HOUSTON, TEXAS
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W O NO 04603-022-034-2400

offsite reconnaissance due to locked gates. No barriers restrict access to about one-half of the Carter property. The other half of this property is restricted due to a fence that connects to the fences on the Card Blanc property. This fence on the Carter property was reportedly installed by Mr. Dove.

The total acreage of the site is unknown. However, the Carter property encompasses approximately 1.9 acres. The site is bounded to the west and east by East Hardy Road and trees. The Card Blanc property includes several structures and scrap piles. The Carter property consists of an abandoned house (References 7, 8).

Building #1 is a one-story wooden structure measuring approximately 50 feet wide and 75 feet long and is located in the southwest portion of the Card Blanc property. This building appears to have been used for offices (References 7, 8).

Building #2 is an approximate two-story metal structure that measures approximately 75 feet wide and 150 feet long, and it is located just east of Building #1. Building #2 is approximately 20 feet high and appears to have been used as a garage or shop (References 7, 8).

A mobile office trailer is located in the northwest corner of the Card Blanc property. This trailer is approximately 10 feet wide and 40 feet long (References 7, 8).

Three scrap piles were observed on the Card Blanc property. A pile of treated timbers and a pile of tires are located in the southwest corner. In addition, a large scrap pile consisting of unknown materials is located in the eastern portion (References 7, 8). The sizes of these piles could not be determined from the perimeter of the site, but all appeared to be less than 100 feet by 100 feet in size.

The Carter property consists of an abandoned two-story house that does not appear to be inhabited (References 7, 8).

2.1.4 Site Operational History

According to Mrs. Carter, Mr. Dove has owned the Card Blanc property for approximately 20 to 30 years. Based on information collected during this PA, Mr. Dove operated a heavy equipment business. The Carter property was formerly owned by Mrs. Carter's parents. They bequeathed the property to their son and Mrs. Carter's brother, Mr. Delbert Riley. Mr. Riley resided onsite until Mrs. Carter acquired ownership upon his death (References 7, 8).

2.1.5 Site Regulatory Compliance History

WESTON reviewed available files and interviewed authorities from regulatory agencies to collect background information regarding the regulatory compliance history of the site. Information regarding regulatory compliance issues, previous investigations, and a chronological history of site activities are summarized in the following paragraphs.

According to Mr. Gene Mann of Mann Warehouse, Lockwood National Bank of Houston took possession of the salvage materials in Mann Warehouse as a part of a foreclosure action against Mr. Mann on a \$1,200,000 debt in 1987. The salvaged materials and chemicals were sold in a public sale on 23 October 1987 to the highest bidder as required by a court order issued by Judge Louis Moore of the 281st Civil District Court. The materials were purchased by the three owners of Page Turbines Incorporated of Houston, Texas. The three owners are reportedly: Mr. Craig McLerran, Mr. Charles Pete Miller, and Mr. Jesse Jackson (Reference 9). Mr. Mann reportedly stated that the materials are hazardous which have been under investigation by the Texas Water Commission (TWC) and the Fire Marshall for violations (Reference 10).

The salvage materials were required by the terms of the sale to be removed from the Mann Warehouse property by 30 December 1987. The drums were not removed from the premises by 30 December 1987 and a new rental agreement between Mann Warehouse and Page Turbines, Inc. gave the new owners monthly rental of the Mann Warehouse property. This rental agreement continued until removal of the materials on 5 May 1988 (Reference 9).

On 1 February 1988, a field investigation was conducted by Ms. Linda Kuhn of the TWC District 7 Field Office (at the request of the City of Houston Environmental Department) of the Mann Warehouse at 1120 Lockwood Drive, Houston, Texas. The investigation documented improperly stored drums and a notice of violation (NOV) letter, dated 5 February 1988, was issued. This letter was sent to Mr. Gene Mann of Mann Warehouse and ordered the disposal of the salvage materials in a proper manner and remediation of any contaminated soils. Mr. Mann responded by stating that he no longer owned the drums and that he was only providing rental space (Reference 9).

On 5 May 1988, Ms. Kuhn received a telephone call from Mr. Mann indicating that the drums were being loaded on trucks for removal from the Mann Warehouse property. Mr. Mann stated that the new owners may not have been properly managing the salvage material. Ms. Kuhn proceeded to conduct a second field inspection on the same day. During this inspection, the new owners (Page Turbines, Inc.) strongly contended that the drums and chemicals were salvage materials and not waste. The owners stated that they sold the salvage materials to Provcedoro Del Bravo of Matamoros, Mexico (Reference 9).

The salvage materials were transported from the Mann Warehouse to the Carter property by Malvo's Trucking. According to Mr. Dove, the materials were brought to the Carter property based on an arrangement with Mr. James Moore of Coastal Salvage Company, Houston, Texas (acting as an agent for Page Turbines, Inc.) with the reported permission of Mr. Delbert Riley. It should be noted that Mr. Riley was reportedly feeble and in poor health. The Carter property was to be used for only one to two days in which the salvage materials were to be sorted, repacked, and shipped to Mexico. Mr. Moore and Page Turbines, Inc. reportedly never returned to the site to dispose of the materials (Reference 9).

Burial of drums containing hazardous wastes at the Card Blanc property was anonymously reported to the Harris County Pollution Control Department (HCPCD) on 31 January 1991 (Reference 11).

On 1 February 1991, Mr. Patrick Pendleton of the HCPCD conducted a Site Investigation at the Card Blanc property after receiving an anonymous complaint alleging that hazardous wastes were being buried on the property (Reference 12). Subsequently, he conducted a Site Investigation at the Carter property after large quantities of oil well chemicals and other chemicals stored in metal, paper fiber and plastic drums and paper bags on pallets were observed (Reference 10).

A small pit (approximately 12 feet by 6 feet) which was being used for the disposal of rubbish and oil filters was identified near the east fence on the Carter property. These materials appeared to be generated at the Card Blanc property, possibly at the large shop that was being used to rebuild industrial type trailers, dozers and fork lifts. About 18 55-gallon drums that were leaking oil were observed approximately 150 feet from the southeast corner of the Card Blanc property (Reference 12).

During a subsequent phone conversation with Mr. Dove, he did not acknowledge that Card Blanc employees were dumping wastes in the pit. He stated that he had rented the property in the past but no longer had any need for the property (Reference 12). Mr. Dove also stated that Mr. Riley had died and left the property to his sister, Mrs. Estelle Carter (Reference 10).

The containers at the Carter property were inspected and the following information was determined based on the labels (Reference 10):

- Numerous bags of Anionic Cellulosic Polymer (a drilling fluid additive),
- Numerous fiber drums containing Alcoa Activated Alumina (400 pounds per drum),
- Many bags labeled Oilfaz,
- Many bags labeled Dowell Division of Dow Chemical,
- Many 5-gallon buckets labeled Caustidamp 1 - vibration damping coating,
- Twelve 60-gallon salvage drums (contents unknown),
- Eleven 55-gallon plastic drums, some labeled Aqua Ammonia 26BE, and
- Approximately 100 55-gallon metal drums in which some appeared to be leaking unknown contents.

Several of the paper fiber drums and bags were deteriorating and leaching salt-like material on the ground. Dead vegetation around these drums and bags was observed. Some of the metal drums were also observed leaking. Based on this investigation, Page Turbines, Inc. was determined to be the responsible party for the abandonment of the chemicals and liable for the remediation of the site and subject to civil prosecution for violations of the Texas Solid Waste Disposal Act (Reference 10).

At the request of Mr. Pendleton on 11 March 1991, a TWC Complaint Investigation at the direction of Robert Musick was conducted at the Carter property on 14 March and 10 October 1991. This investigation included a meeting with Mr. Dove (Reference 9).

On 28 March 1991, Mr. Paul Gibbins of the HCPCD conducted a Site Investigation at Card Blanc and Carter properties in response to an anonymous phone call reporting that outdoor burning was occurring at the northeast corner of the Card Blanc Services of America, Inc. site. Mr. Gibbins observed smoke emanating from the Carter property. Mr. Gibbins entered this property and identified an employee of Card Blanc overseeing the fire. The fire was located at the western edge of a small pit at the rear of the property. The burning debris consisted of carpet padding, household garbage, and large oil filters. Mr. Gibbins also observed tire tracks at the pit originating from the Card Blanc property (Reference 13).

The TWC prepared an Interoffice Memorandum dated 31 October 1991 requesting that a state funded cleanup be conducted at the site. The TWC referred the site to the US EPA Emergency Response Branch (ERB).

On 13 December 1991, an Initial Site Assessment was performed by Ecology and Environment, Inc., the US EPA-ERB's Technical Assistance Team (TAT). The TAT's assessment identified the following containers (Reference 14):

- Approximately 116 55-gallon and 85-gallon deteriorating and leaking steel drums;
- Nine 55-gallon polyethylene drums bearing labels identifying the contents as "aqua ammonia" and "glacial acetic acid";
- Other labels on the above containers included "furfuryl alcohol" and "ethylene glycol";
- Over 100 5-gallon poly containers on pallets scattered throughout the site. One of these containers was labeled "Cousti-Damp" (a non-hazardous anti-vibration agent).
- A number of 35-gallon fiberboard drums that were wet and deteriorating. Several of these drums were labeled "activated alumina" (an intermediate product in the production of aluminum).
- Numerous 40-60 pound sacks of material were noted on pallets near the abandoned drums.

On 2 January 1992, a Comprehensive Sampling Assessment was conducted by the TAT. Field hazard categorization detected flammable and corrosive liquids. The TAT collected six liquid and four soil samples which were all analyzed for volatile organics, semi-volatile organics, pesticides, polychlorinated biphenyls (PCBs), and Target Compound List metals. Volatile organics detected included methylene chloride, hexane, acetone, toluene, ethylbenzene, and

xylene. Semi-volatile organics detected included phenanthrene and phenol. Pesticide compounds detected included 4,4-dichlorodiphenyltrichloroethane (DDT), aldrin, lindane and chlordane in three of the four soil samples (Reference 14).

On 25 August 1992, Mr. Mike Williams, the EPA On-scene Coordinator (OSC) mobilized the Emergency Response Cleanup Services (ERCS) Contract to conduct a removal action at the Carter Site. On this date, ERCS arrived at the site to cover the deteriorating drums and containers with plastic sheeting as a preventive measure in the event Hurricane Andrew made landfall in the Houston area (Reference 15).

A Site Assessment was conducted on 4 September 1992 by the TAT at the Card Blanc property. On 10 September 1992, three soil samples were collected and analyzed for Priority Pollutant Metals, volatile organics, semi-volatile organics, PCBs and pesticides. The analytical results were not provided (Reference 16).

On 14 October 1992, the EPA initiated a removal action under the authority of CERCLA as amended by SARA. A Removal Action was performed during periods of 6 October 1992 through 28 November 1992 (Phase I) and 29 March 1993 through 13 April 1993 (Phase II) by US EPA-ERB assisted by the TAT. Materials staging began on 15 October 1992. Sampling began on 26 October 1992, and hazard categorization began on 27 October 1992. Based on the categorization results, the materials were separated into the following seven waste streams (Reference 15):

- Flammable Solids,
- Non-characteristic Solids,
- Non-characteristic Liquids,
- Corrosive Acids,
- Basic Solids,
- Flammable Liquids, and
- Oxidizing Solids.

On 6 November 1992, the TAT collected five composite soil samples, three from a grid where contaminated soil had been scraped up and two from the soil pile resulting from the surface soil scraping. The samples were analyzed for PCBs, pesticides, semi-volatiles, volatiles, metals, and total cyanide. OSC Williams determined that no additional soil removal was necessary based on the analytical results. The TAT and ERCS demobilized on 20 November 1992, concluding Phase I of the removal action (Reference 15).

During the time between phases of the removal action, samples of each waste stream were analyzed and bids on the disposal of drummed materials from several disposal facilities were obtained. Two facilities were selected: Laidlaw Environmental Services for the disposal of all drummed materials and Western Waste for the disposal of roll-off boxes containing soil, personal protective equipment (PPE) and site debris (Reference 15).

Phase II of the removal action began on 29 March 1993. Contents of the fiber drums, sacks and small containers were transferred to reconditioned or new 55-gallon drums. Steel 55-gallon drums that had suffered further deterioration since the Phase I activities were overpacked into 85-gallon salvage drums. A total of 288 drums were sent to Laidlaw on 8 and 9 April 1993 and a total of four 25-cubic yard roll-off boxes were sent to Western Waste on 12 and 13 April 1993 (Reference 15).

2.1.6 Nearby Land Use

Land use in the vicinity of the site was observed during reconnaissance. The site is located in a small urban area in Houston, Texas. The land immediately adjacent to the site is described as follows:

- East Hardy Road and the Hardy Toll Road border the west side of site,
- Collins Road borders the north side of the site,
- Vegetation consisting of trees and brush border the east side of site, and
- Vacant property borders the south side of site.

Other notable features within one mile of the site include:

- Halls Bayou,
- A golf course,
- Athletic fields, and
- Residential housing.

No alternative source sites which might be contributing a release of hazardous substances, similar to those found at the site, to the migration pathways were identified.

2.2 SOURCE WASTE CHARACTERISTICS AND SITE CONCERNS

The potential hazardous waste source areas identified at the site are described in this section along with site-related concerns regarding the migration of hazardous substances attributable to the site via the groundwater, surface water, soil exposure and air pathways.

2.2.1 Known and Potential Hazardous Waste Source Areas

Based on available background information, three potential hazardous waste source areas (HWSAs) have been identified at the site. These source areas are summarized in Table 2-1, and are described in further detail in the following subsections.

2.2.1.1 Contaminated Soils #1

A number of containers ranging in sizes from 5-gallon to 85-gallon capacities and 40 to 60 pound sacks were observed leaking during several inspections from 1988 until 1991 (References 9, 10, 11, 12, 13, 14, 15, 16). Reportedly, soils impacted from leaking drums were excavated

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**CARD BLANC/CARTER
HOUSTON, TEXAS**

EPA CERCLA I.D. NO. TXD988061446

TABLE 2-1

SOURCE WASTE CHARACTERISTICS

SOURCE NAME	LOCATION	SOURCE TYPE	ESTIMATED WASTE QUANTITY	DESCRIPTION OF THE SOURCE
Contaminated Soils #1	Carter property	Various oil field-related materials	Area = 60 ft x 60 ft = 3600 ft ²	Leaking containers and sacks.
Contaminated Soils #2	Card Blanc property	Oil	Area = 13 ft x 25 ft = 325 ft ²	Drums leaking oil.
Burn Pit	Carter property	Rubbish and oil filters	Area = 6 ft x 12 ft = 72 ft ²	Burning trash and oil filters in a pit.

SOURCES: Interoffice Memorandum, TWC (Reference 9)
"Investigation Report - 11548 East Hardy" (Reference 10)
Harris County Pollution Control Department Complaint (Reference 11)
"Investigation Report - 11532 East Hardy" Reference 12)
"Investigation Report - 11532 and 11548 East Hardy Road" (Reference 13)
"Site Assessment Report for Card Blanc Salvage Site" (Reference 14)
"Draft Removal Funded Report for Card Blanc/Carter Site" (Reference 15)
"Site Assessment Report for Card Blanc Salvage" (Reference 16)

and removed from the site. However, information documenting the location of the excavation(s), the amount of soil excavated, and the location of samples collected were not provided in any of the reports made available to WESTON. WESTON assumes that impacted soils remain onsite in a limited area. This area is assumed to measure 60 feet wide and 60 feet long which is based on approximately 225 containers having an average diameter of 2 feet, a spacing of 1 foot between containers, and that the containers were placed in a 15 by 15 container grid. This area includes additional space for the numerous 40 to 60 pound sacks.

2.2.1.2 Contaminated Soils #2

About 18 55-gallon drums that were leaking oil were observed approximately 150 feet from the southeast corner of the Card Blanc property during a HCPCD investigation (Reference 12). WESTON assumes that soils impacted from these drums remain onsite, and they encompass an area measuring 13 feet wide and 25 feet long. This area is based on three adjacent rows with six drums in each row, the drums having an average diameter of 3 feet, and a 1 foot spacing between each drum.

2.2.1.3 Burn Pit

A pit measuring approximately 12 feet by 6 feet located near the rear of the Carter property that was being used for the disposal of rubbish and oil filters was identified during a HCPCD inspection on 1 February 1991. These materials appeared to be generated at the Card Blanc property, possibly at the large shop that was being used to rebuild industrial type trailers, dozers and fork lifts (Reference 12).

On 28 March 1991, Mr. Paul Gibbins of the HCPCD conducted a Site Investigation at Card Blanc and Carter properties in response to an anonymous phone call reporting that outdoor burning was occurring at the northeast corner of the Card Blanc Services of America, Inc. site. Mr. Gibbins observed smoke emanating from the Carter property. Mr. Gibbins entered the Carter property and identified an employee of Card Blanc overseeing a fire. The fire was located at the western edge of the pit. The burning debris consisted of carpet padding, household garbage, and large oil filters (Reference 13).

WESTON assumes that soils impacted from the burning and disposal of debris in the pit remain onsite.

2.2.2 Site Concerns

Information regarding the location and amount of impacted soils removed from the site was not available to WESTON. Therefore, impacted soils are assumed to remain onsite. However, with the exception of soil exposure, the migration of hazardous substances from the site and the exposure of humans and other environmental receptors to hazardous substances is not apparent.

SECTION 3

GROUNDWATER PATHWAY

A discussion of the groundwater pathway, one of four major pathways of potential hazardous waste migration assessed in this report, is provided in this section. The discussion focuses on the aquifer characteristics of the region, the likelihood of a release to groundwater, and the potential targets of hazardous waste migration through the groundwater pathway.

3.1 HYDROGEOLOGIC SETTING

3.1.1 Geologic Framework

The CBC Site is located in the Lower Coastal Plain physiographic province of Texas. Geologically, this area consists of fluvial, deltaic, coastal marsh, and lagoonal deposits of Miocene to Holocene age. The sedimentary deposits slope gently toward the Gulf of Mexico. From youngest to oldest, the geologic units nearest to the surface at the site include the following (References 17, 18):

- The Pleistocene-age Beaumont Formation,
- The Pleistocene-age Montgomery Formation,
- The Pleistocene-age Bentley Formation,
- The Pleistocene-age Willis Formation,
- The Miocene-age Fleming Formation, and
- The Miocene-age Catahoula Formation.

The Beaumont Formation consists mostly of clay, silt, and relatively little sand. This formation was primarily deposited in a fluvial environment consisting of numerous back water swamps, and to a lesser extent coastal marshes and mud flats. The overall thickness of the Beaumont Formation can be up to approximately 100 feet (References 17, 18).

The Montgomery Formation underlies the Beaumont Formation. The Montgomery Formation consists of clay, silt, and very minor siliceous gravel of granule to pebble size. This fluvial deposit can be up to approximately 100 feet thick (References 17, 18).

The Bentley Formation underlies the Montgomery Formation. The Bentley Formation consists of fluvial deposits of clay, silt, sand, and minor amounts of gravel. The thickness of the Bentley Formation can be up to approximately 100 feet (References 17, 18).

The Willis Formation underlies the Bentley Formation. The Willis Formation consists of fluvial deposits of clay, silt, sand, and siliceous gravel of granule to pebble size with some petrified wood. The overall thickness of the Willis Formation can be up to approximately 100 feet (References 17, 18).

The Fleming Formation underlies the Willis Formation. The Fleming Formation consists of clay, silt, sand, and granule to pebble size gravel with some petrified wood. The thickness of the Fleming Formation can be up to approximately 1450 feet (References 17, 18).

The Catahoula Formation underlies the Fleming Formation. The Catahoula Formation consists of mudstone in the upper part and coarse grained quartz sand in the lower 10 to 80 feet. The overall thickness of the Catahoula Formation can be up to 300 feet (References 17, 18).

The actual thicknesses of the above-described formations at the site are unknown based on information currently available to WESTON.

3.1.2 Groundwater Conditions

The aquifer identified at the CBC Site is the Gulf Coast Aquifer. This aquifer extends to a maximum depth of approximately 3000 feet below the ground surface. The principal water bearing units within the Gulf Coast Aquifer are the Chicot and Evangeline Aquifers. The Chicot Aquifer occurs in the Holocene alluvium through the Willis Formation, and is believed to be 50 to 75 feet below the ground surface at the site. However, documentation indicating the depth of the saturated zone in the area of the site was not obtained. Wells in the area of the site are believed to be completed within this aquifer because the Gulf Coast Aquifer underlies the entire San Jacinto River Basin which is the basin where the site is located (References 19, 20).

The Evangeline Aquifer underlies the Chicot Aquifer and is located within the Fleming Formation (References 19, 20).

Large-capacity wells in the Gulf Coast Aquifer have an average yield of 1800 gallons per minute (gpm), and a maximum yield ranging up to 2900 gpm. Saline water encroachment has occurred due to a decline of artesian pressure (Reference 19).

3.2 LIKELIHOOD OF RELEASE

Important factors related to the likelihood of a release from a source of hazardous substances at the site to groundwater are presented in this section.

3.2.1 Depth to Groundwater

Based on the descriptions of the regional aquifers in the area, the depth to the most shallow zone at the site that produces sufficient water for domestic or agricultural uses is approximately 50 feet (Reference 19, 20).

3.2.2 Net Precipitation

The average annual precipitation in the area of the site is approximately 44 inches. The annual average gross lake surface evaporation rate in the area of the site is approximately 52 inches. Therefore, the average annual net precipitation in the area of the site is approximately minus 8 (-8) inches (Reference 21).

3.2.3 Thickness of Impermeable Layer

The clay units of the Beaumont Formation are considered to be the most impermeable layers between the surface and groundwater in the Chicot Aquifer. The thickness of the near surface clay at the site is estimated to be approximately 30 to 50 feet (Reference 19, 20).

3.2.4 Hydraulic Conductivity of Impermeable Layer

The hydraulic conductivity of the impermeable layer is estimated to be on the order of 1×10^{-7} centimeters per second (Reference 22). This hydraulic conductivity value has not been verified by testing clay samples from the site.

3.3 GROUNDWATER PATHWAY TARGETS

The potential receptors, or targets, of the groundwater pathway include the population and resources which rely on local aquifers as a source of water supply. The targets identified for the groundwater pathway are discussed in the following sections.

3.3.1 Nearest Well

According to the TWC, the nearest known active well to the CBC Site is a City of Houston public supply well (shown as Well No. 136 on Figure 3-1 and listed in Table 3-1) located approximately 0.3 mile southwest of the site (Reference 23). According to the Harris County Subsidence District (HCSD), public supply wells in Houston, Texas are a supplemental drinking water supply source in addition to primary sources, surface water bodies. These public supply wells may provide drinking water to residential homes or businesses (Reference 24).

The HCSD, TWC, and the Texas Water Development Board (TWDB) use different well numbering systems. Therefore, specific information relating to Well No. 136 was not determined during this PA.

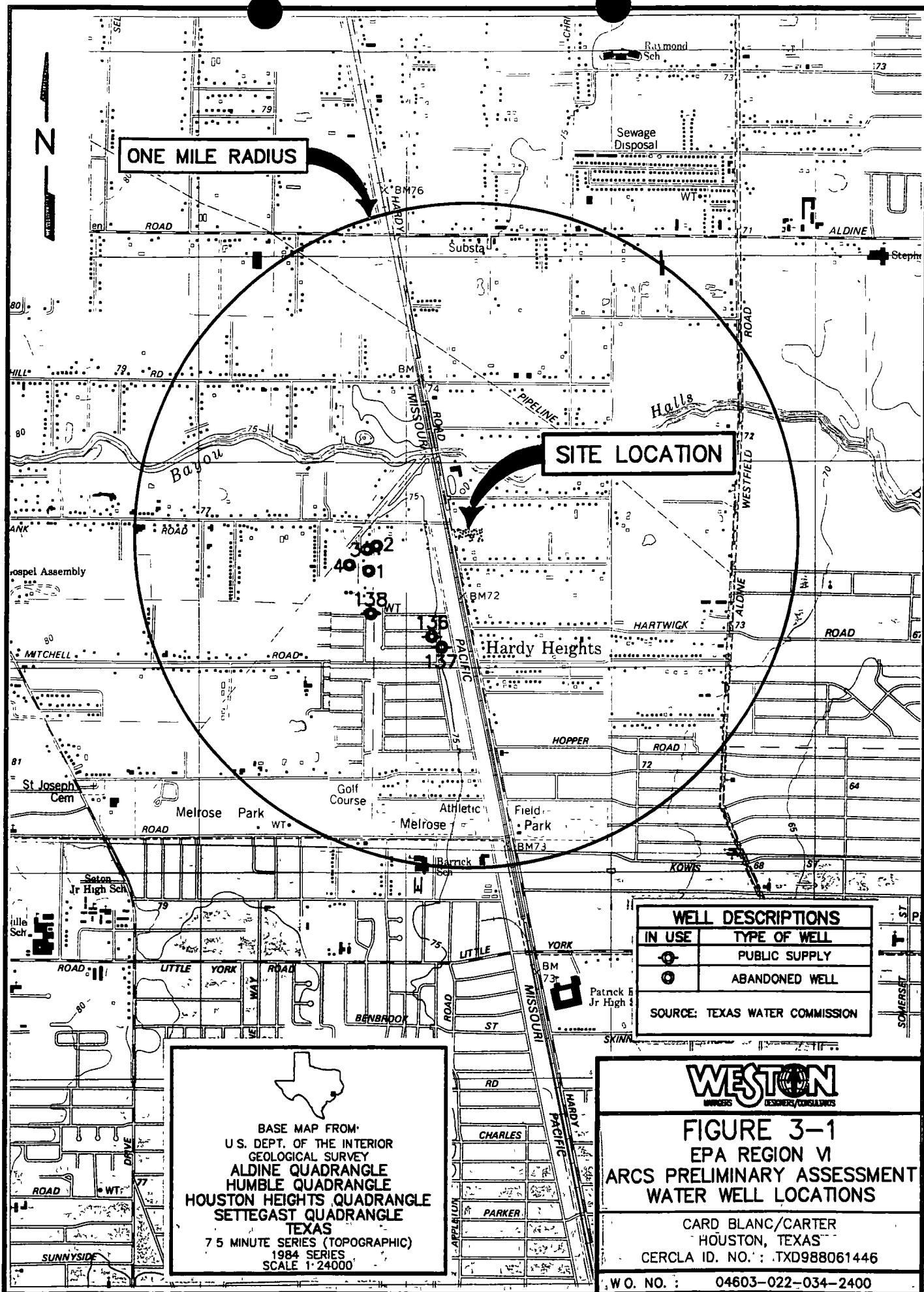
No population has been attributed to Well No. 136.

3.3.2 Other Nearby Wells

There are possibly six active groundwater wells located within 1 mile of the site in addition to Well No. 136. Well No. 137 and 138 (shown on Figure 3-1 and listed on Table 3-1) are City of Houston public supply wells located approximately 0.3 and 0.4 mile southwest of the site (References 2, 23, 24).

The HCSD, TWC, and the TWDB use different well numbering systems. Therefore, specific information relating to Well No. 137 and 138 was not determined during this PA.

In addition, there are four abandoned wells (Well No. 1, 2, 3, and 4) located within 1 mile of the site. These are shown on Figure 3-1 and listed in Table 3-1. According to the HCSD, abandoned wells are not currently used but may remain functionable (References 2, 23, 24).



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TABLE 3-1

WATER WELL LOCATIONS

WELL ID.	WELL OWNER	APPROXIMATE DISTANCE FROM SITE (miles)	TOTAL WELL DEPTH (feet)	DEPTH TO TOP OF SCREEN (feet)	ESTIMATED POPULATION SERVED	STATUS AND TYPE OF WELL
136	Unknown ¹	0.3	Unknown ¹	Unknown ¹	Unknown ¹	Active; Public Supply
137	Unknown ¹	0.3	Unknown ¹	Unknown ¹	Unknown ¹	Active; Public Supply
2	Unknown ¹	0.3	Unknown ¹	Unknown ¹	Unknown ¹	Abandoned; Unknown ¹
3	Unknown ¹	0.3	Unknown ¹	Unknown ¹	Unknown ¹	Abandoned; Unknown ¹
1	Unknown ¹	0.3	Unknown ¹	Unknown ¹	Unknown ¹	Abandoned; Unknown ¹
138	Unknown ¹	0.4	Unknown ¹	Unknown ¹	Unknown ¹	Active; Public Supply
4	Unknown ¹	0.4	Unknown ¹	Unknown ¹	Unknown ¹	Abandoned; Unknown ¹

¹The TWDB does not have the information available. In addition, the TWDB, TWC, and the HCSD use different numbering systems.

SOURCES: USGS 7.5-Minute Topographic Maps (Reference 2)
Texas Water Commission (Reference 23)
Harris County Subsidence District (Reference 24)

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SECTION 4

SURFACE WATER PATHWAY

Surface water is the second of four pathways of potential hazardous waste migration assessed for the site. The types of surface water draining the site, the Probable Point of Entry (PPE) for a hazardous substance from the site to enter surface water, the likelihood of a release, and the potential targets of the pathway are discussed in this section.

4.1 HYDROLOGIC SETTING

The CBC Site is located in the San Jacinto River Basin. The East Fork and West Fork of the San Jacinto River merge in the headwaters of Lake Houston. The East Fork receives natural loads or runoff from heavily forested areas. The West Fork receives waste loads. The river is tidally affected below the Lake Houston Dam, and becomes a part of the Houston Ship Channel before entering Galveston Bay. The San Jacinto River is 85 miles long, and approximately 2.5 million people live within the basin. (Reference 19).

On a more local scale, surface water at the site flows through an overland flow segment, enters the surface water at the PPE, and flows downstream via Halls and Greens Bayous. These segments of the surface water pathway are discussed in the following sections.

4.1.1 Overland Flow Segment

The general topography of the area around the site indicates that surface water flows north along East Hardy Road and eventually discharges into Halls Bayou (Reference 2, 25). Surface water flow across the site could not be verified in the field because an onsite reconnaissance was not performed. It is possible due to the commercial and residential development in the area that surface runoff from the site enters stormwater sewers along either Collins or East Hardy Road.

4.1.2 Surface Water Flow Path

The surface water pathway is illustrated in Figure 4-1 (References 2, 25). The flow path of surface water from the PPE to a point 15 stream miles downstream in this pathway via Halls and Greens Bayous is summarized in Table 4-1.

4.1.3 Probable Point of Entry

The PPE for a release of hazardous substance from a source at the site to a surface water body in the primary surface water pathway is located approximately 0.2 mile downstream from the site at Halls Bayou as shown on Figure 4-1 (Reference 2, 25).

4.2 LIKELIHOOD OF RELEASE

Important factors related to the likelihood of a release from a source of hazardous substances at the site to surface water are presented in the following sections.

No population has been attributed to the public supply or abandoned wells.

3.3.3 Well Head Protection Areas

No Well Head Protection Areas (WHPAs) have been identified within 4 miles of the site.

3.3.4 Groundwater Resources

Groundwater from the Gulf Coast Aquifer is commonly used for stock and irrigation purposes (Reference 19). Groundwater near the site is considered to be a resource since it may be used for agricultural purposes.

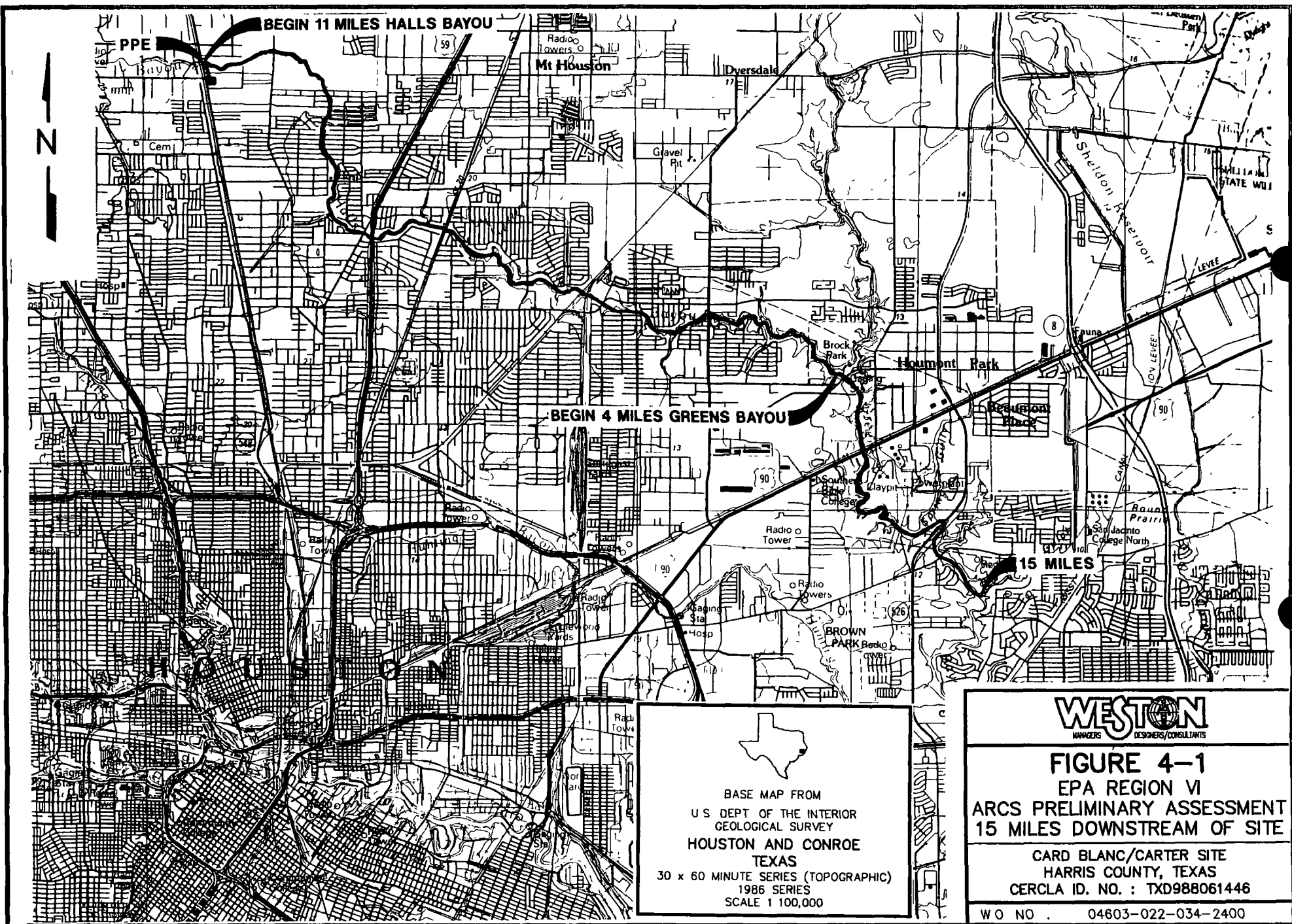
3.4 GROUNDWATER PATHWAY CONCLUSIONS

An observed release of hazardous substances to groundwater attributable to the site has not been documented. Based on the site reconnaissance and available information regarding the site history, a release to groundwater is not probable for the following reasons:

- The near surface soils have low permeabilities; and
- The depth to the most shallow groundwater is believed to be 50 or more feet.

Remaining data gaps for the groundwater pathway include the following:

- Identification of Wellhead Protection Areas,
- Determination of the exact number of people per well near the site and the uses for Well Nos. 136, 137, and 138,
- Determination of thicknesses of the formations located at the site,
- Determination of the depth to groundwater at and near the site, and
- Determination of the impact, if any, to groundwater at or near the site due to the abandoned, leaking, and deteriorating salvage materials that were onsite for approximately 5 1/2 years.



BASE MAP FROM
U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
HOUSTON AND CONROE
TEXAS
30 x 60 MINUTE SERIES (TOPOGRAPHIC)
1986 SERIES
SCALE 1:100,000

WESTON
MANAGERS DESIGNERS/CONSULTANTS

FIGURE 4-1
EPA REGION VI
ARCS PRELIMINARY ASSESSMENT
15 MILES DOWNSTREAM OF SITE

CARD BLANC/CARTER SITE
HARRIS COUNTY, TEXAS
CERCLA ID. NO. : TXD988061446

W O N O . 04603-022-034-2400

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TABLE 4-1

SURFACE WATER DRAINAGE PATHWAY SUMMARY

SURFACE WATER SEGMENT	APPROXIMATE DISTANCE FROM A SOURCE AREA IN MILES	APPROXIMATE DISTANCE FROM PPE IN MILES	ESTIMATED FLOW RATE AND DIRECTION OF FLOW (Cubic Feet Per Second)
Halls Bayou	0.2	0	100 CFS TO 1,000 CFS ¹
Greens Bayou	11.2	11	100 CFS TO 1,000 CFS ¹

¹This value is estimated based on size of the stream.

Source: USGS 7.5 Minute Topographic Maps (Reference 2)
30 x 60 Minute Quadrangle Maps (Reference 25)

4.2.1 Distance to Surface Water

The shortest distance from the site to a notable overland flow drainage pathway was not determined during this PA since only an offsite reconnaissance was completed.

4.2.2 Flood Frequency

The floodplain where the site is located was not determined during this PA.

4.2.3 2-Year 24-Hour Rainfall

The 2-year 24-hour rainfall for the area of the site is approximately 4.75 inches (Reference 26).

4.2.4 Flood Containment

The potential HWSAs are assumed to only include subsurface contamination since surface soils were scraped during the removal action in 1992 and 1993. This could not be verified in the field since only an offsite reconnaissance was performed.

If surface contamination remains in the potential HWSAs, it is assumed that they have no containment features which would prevent or contain a release in the event that the sources became flooded.

4.3 SURFACE WATER PATHWAY TARGETS

The potential targets of the primary surface water pathway include the population relying on surface water downstream of the PPE as a source of drinking water, as well as the downstream fisheries, sensitive environments and surface water resources. The targets identified within the surface water pathway are discussed in the following sections.

4.3.1 Drinking Water Intakes

No drinking water intakes are known to be present within the surface water pathway.

4.3.2 Wetlands and Other Sensitive Environments

According to federal wetlands inventory maps (Reference 27), wetlands are present along the surface water pathway. The total wetlands frontage within 15 miles downstream of the PPE is approximately 0.08 miles. It should be noted that approximately 7.5 miles of the surface water pathway could not be evaluated for the existence of wetlands because the map that covers this portion of the in-water segment was not available. There are probably more unidentified wetlands within the 15 mile path from the PPE. The locations and frontage of identified wetlands are summarized in Table 4-2.

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TABLE 4-2

WETLANDS AND OTHER SENSITIVE ENVIRONMENTS

Stream Segment Name	Frontage (Miles)
Halls Bayou	Unknown ¹
Greens Bayou	0.08

¹Approximately 7.5 miles of the surface water pathway could not be evaluated for the existence of wetlands because the map that covers this portion of the in-water segment was not available.

SOURCE: Federal Wetlands Inventory Map (Reference 27)

Several federally-listed threatened or endangered species are thought to potentially occupy the surface water pathway environments in the vicinity of the site (Reference 28). These are listed in Table 4-3.

4.3.3 Fisheries

No commercial fisheries have been identified within the surface water pathway. However, segments of this surface water pathway, such as Halls or Greens Bayou, may be used for recreational fishing (References 7, 8, 25). Fishing in these water bodies was not observed during reconnaissance of the surface water pathway (Reference 7).

4.4 SURFACE WATER PATHWAY CONCLUSIONS

An observed release of hazardous substances to the surface water pathway attributable to the site has not been documented.

A release to surface water attributable to the CBC Site is not probable due to the types of potential HWSAs at the site (References 9, 10, 11, 12, 13, 14, 15, 16).

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TABLE 4-3

FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES

TYPE	Common Name	Scientific Name	STATUS	Notes
Plant	Prairie Dawn	<u><i>Hymenoxys texana</i></u>	Endangered	Not Applicable
Amphibian	Houston toad	<u><i>Bufo houstonensis</i></u>	Endangered	Potential occurrence
Birds	Arctic peregrine falcon	<u><i>Falco peregrinus tundrius</i></u>	Endangered	Migrant
	Bald eagle	<u><i>Haliaeetus leucocephalus</i></u>	Endangered	Nesting activity and winter concentration
	Red-cockaded woodpecker	<u><i>Picoides borealis</i></u>	Endangered	Year-round resident

SOURCE: U.S. Fish and Wildlife Service (Reference 28)

SECTION 5 SOIL EXPOSURE

Soil exposure is another potential route of exposure to hazardous substances attributable to the site. The discussion in this section focuses on the important soil exposure factors such as soil type, area of contamination, accessibility and the likelihood of exposure, and the potential targets.

5.1 SURFICIAL CONDITIONS

5.1.1 Soil Type

The soil type found at the CBC Site is the Addicks-Urban land Complex. Generally, this series consists of poorly drained and nearly level. The slopes in this series range from 0 to 1 percent (Reference 29).

5.1.2 Areas of Contamination

No areas of potential soil contamination onsite were observed during the offsite reconnaissance activities (References 7, 8). However, three areas of potential contamination (previously discussed in Sections 2.2.1.1, 2.2.1.2, and 2.2.1.3) are assumed to remain onsite, and include Contaminated Soils #1, Contaminated Soils #2, and the Burn Pit.

Contaminated Soils #1 includes soils that have been impacted by the numerous abandoned containers and salvage materials brought to the site in May 1988. These soils are assumed to remain onsite even though a removal action has occurred. The area is assumed to measure 60 feet wide and 60 feet long which is based on approximately 225 containers having an average diameter of 2 feet, a spacing of 1 foot between containers, and that the containers being stationed in a 15 by 15 container grid. This area includes space for the numerous 40 to 60 pound sacks.

Contaminated Soils #2 includes soils that have been impacted by 18 55-gallon drums that were observed leaking oil during a previous site inspection. It is assumed that soils impacted from these drums remain onsite, and they encompass an area measuring 13 feet wide and 25 feet long. This area is based on three adjacent rows with six drums in each row, the drums having an average diameter of 3 feet, and a 1 foot spacing between each drum.

The Burn Pit was observed during a previous site inspection. This pit measured approximately 12 feet by 6 feet and was being used for the disposal of rubbish and oil filters. This pit was later observed being used for burning debris, including garbage and large oil filters. It is assumed that soils impacted by the disposal and burning of materials remain onsite.

5.2 LIKELIHOOD OF EXPOSURE

Important factors related to the likelihood of exposure to an area of contaminated soil or direct contact with another source of hazardous substances at the site are presented in the following sections.

5.2.1 Attractiveness of the Site

The CBC Site is not used for recreational purposes. The site is located just north of downtown Houston and near a small residential neighborhood (Reference 7, 8).

5.2.2 Site Accessibility

The CBC Site is easily accessible off East Hardy Road and Collins Road just north of downtown Houston. A fence with three gates encompass the Card Blanc property. The entrances to the Card Blanc property were restricted during the offsite reconnaissance due to locked gates. No barriers restrict access to about one-half of the Carter property. The other half of this property is restricted because of a fence that trends north to south and connects to the fences on the Card Blanc property (References 7, 8).

5.3 SOIL EXPOSURE TARGETS

The resident population living or working in an area of soil contamination, the population living near areas of soil contamination, designated recreational areas and terrestrial resources such as agriculture are potential targets of soil exposure. The soil exposure targets identified are summarized in the following sections.

5.3.1 Resident Population

The resident population includes those persons in houses, schools or daycare facilities who are located on a property where soil contamination attributable to the site has been documented and whose residence is within 200 feet of that contamination.

The CBC Site includes two vacant and abandoned properties (References 7, 8).

It is not suspected that areas of soil contamination are present in offsite properties around the site. Therefore, the people living in these offsite areas cannot be counted as a resident population.

5.3.2 Nearby Population

The nearby population includes persons who live in houses, or attend schools or daycare centers within 1 mile of areas of soil contamination attributable to the site.

USGS 7.5-minute topographic maps (Reference 2), 1990 Census information (Reference 30), the EPA Geographical Exposure Modelling System (GEMS) (Reference 31) were used to estimate

the population living in specific distance intervals around the site. The population distribution is summarized in Table 5-1.

Based on 1990 Census information, there are approximately 2,435 persons per square mile and 2.8 persons per household living in Houston, Harris County, Texas (Reference 30).

Population centers within one mile of the site, which may include schools, churches and recreational areas, have been identified based upon review of USGS topographic 7.5-minute quadrangle maps of the area and are summarized in Table 5-2 (Reference 2).

5.3.3 Sensitive Environments

Harris County, Texas is a habitat for the Houston toad, Artic falcon, red-cockaded woodpecker, and bald eagle, all of which are endangered species (Reference 28).

5.3.4 Resources

No resources are known to exist near the site.

5.4 SOIL EXPOSURE CONCLUSIONS

Observed contamination has not been documented at the site, and WESTON did not observe any potential areas of contamination during offsite reconnaissance activities. However, areas of potential soil contamination that have been impacted from abandoned containers, salvage materials, and disposal and burning activities may remain onsite.

Remaining data gaps for soil exposure include sampling the potential HWSAs and determining the exact population within 1 mile of the site.

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TABLE 5-1

NEARBY POPULATION WITHIN ONE MILE

DISTANCE INTERVAL (miles)	ESTIMATED POPULATION	REFERENCE
0 to 1/4	143	2, 30
1/4 to 1/2	482	2, 30
1/2 to 1	6251	31

Sources: USGS 7.5-Minute Topographic Maps (Reference 2)
1990 Census Information (Reference 30)
Geographical Exposure Modelling System (Reference 31)

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TABLE 5-2

NEARBY POPULATION CENTERS

DISTANCE INTERVALS (miles)	POTENTIAL TARGET
0 to 1/4	None
1/4 to 1/2	None
1/2 to 1	Golf course, Park, Athletic fields

SOURCE: USGS 7.5-Minute Topographic Maps (Reference 2)

SECTION 6

AIR PATHWAY

The discussion in this section of the report focuses on the air pathway, another potential route of hazardous substance migration from the site. Atmospheric conditions, the likelihood of a release to air, and potential air pathway targets are identified below.

6.1 ATMOSPHERIC CONDITIONS

6.1.1 Meteorological Information

A wind rose for the region is available in Reference 21.

Information concerning rainfall in the region has been presented in Section 3.2.2 of the report where it fits more appropriately within the HRS-related format.

6.1.2 Air Monitoring Results

WESTON completed offsite reconnaissance activities in accordance with a site-specific Health and Safety Plan (HASP) prepared prior to the investigation. The reconnaissance was performed using a standard Level-D personal protection protocol in which coveralls and steel-toed boots are worn.

Since an offsite reconnaissance was performed, continuous air monitoring of the breathing zone was not required.

6.2 LIKELIHOOD OF RELEASE

An observed release of hazardous substances from the potential HWSAs at the site to the air pathway was not observed during reconnaissance activities. Considering the nature of the HWSAs at the site, a significant release to air of gases or particulates is not suspected.

6.3 AIR PATHWAY TARGETS

The population, resources and sensitive environments within 4 miles of the site are potential targets of a release of hazardous constituents to the air pathway. The targets identified for the air pathway are discussed in the following sections.

6.3.1 Population Within Four Miles

Using USGS 7.5-minute topographic maps (Reference 2), 1990 Census information (Reference 30), and GEMS (Reference 31), WESTON identified the approximate population residing in specific distance intervals within approximately four miles of the site based on the number of houses present. Houses are represented by small black squares on Figure 2-2. This population is summarized in Table 6-1.

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TABLE 6-1

NEARBY POPULATION WITHIN FOUR MILES

DISTANCE INTERVAL (miles)	ESTIMATED POPULATION	REFERENCE
0 to 1/4	143	2, 30
1/4 to 1/2	482	2, 30
1/2 to 1	6251	31
1 to 2	29807	31
2 to 3	56767	31
3 to 4	72256	31

Sources: USGS 7.5-Minute Topographic Maps (Reference 2)
1990 Census Information (Reference 30)
EPA Geographic Exposure Modelling System (GEMS) (Reference 31)

6.3.2 Sensitive Environments

Sensitive environments have been identified previously in this report. Surface water-related sensitive environments have been described in Section 4.3 - Surface Water Pathway Targets. Terrestrial sensitive environments have been discussed in Section 5.3 - Soil Exposure Targets.

6.3.3 Resources

Terrestrial resources that may be targets of the air pathway have been identified in Section 5.3 - Soil Exposure Targets.

6.4 AIR PATHWAY CONCLUSIONS

An observed release of hazardous substances to the air pathway has not been documented.

A release to air is not of concern because a notable release to air from the onsite source areas are not suspected. A residential neighborhood is located within 1 mile of the site. However, the potential HWSAs onsite are not suspected to release particulates or gases which would endanger the nearby area.

SECTION 7 CONCLUSIONS

The CBC Site is located in Houston, Texas. The site includes two properties: Card Blanc Services of America, Inc. property which is owned by Mr. Ray Dove and the Carter property which is owned by Mrs. Estelle Carter. The Card Blanc property includes several structures and scrap piles. The Carter property includes an abandoned house. Both properties were vacant, inactive, and appeared abandoned during reconnaissance activities.

The CBC Site was anonymously reported to the Harris County Pollution Control Department (HCPCD) in January 1991. Illegal burying and burning of wastes was suspected. A HCPCD site inspection was subsequently performed and revealed the presence of numerous salvage materials that appeared abandoned.

It was determined that the salvage materials originated from the purchase of a warehouse in 1987 in a public sale. The materials were eventually brought to the site in May 1988 and abandoned.

Numerous investigations and inspections followed. In October 1992, a Removal Action was initiated by the US EPA - Emergency Response Branch (ERB) with assistance from the Technical Assistance Team (TAT). The Removal Action was completed in April 1993 when a total of 288 overpacked and salvage drums and four 25-cubic yard roll-off boxes were transported offsite for disposal.

Potential HWSAs identified at the site include the following:

- Contaminated Soils #1 which includes soils that have been impacted by the numerous abandoned containers and salvage materials brought to the site in May 1988. These soils are assumed to remain onsite even though a removal action has occurred. The area is assumed to measure 60 feet wide and 60 feet long which is based on approximately 225 containers having an average diameter of 2 feet, a spacing of 1 foot between containers, and that the containers stationed in a 15 by 15 grid. This area includes space for the numerous 40 to 60 pound sacks.
- Contaminated Soils #2 which includes soils that have been impacted by 18 55-gallon drums that were observed leaking oil during a previous site inspection. It is assumed that soils impacted from these drums remain onsite, and they encompass an area measuring 13 feet wide and 25 feet long. This area is based on three adjacent rows with six drums in each row, the drums having an average diameter of 3 feet, and a 1 foot spacing between each drum.
- A Burn Pit was observed during a previous site inspection. This pit measured approximately 12 feet by 6 feet and was being used for the disposal of rubbish and oil filters. This pit was later observed being used for burning debris, including garbage and large oil filters. It is assumed that soils impacted by the disposal and burning of materials remain onsite.

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Concerns associated with the migration and exposure pathways are summarized as follows:

- Hazardous substances have not been documented onsite. Sampling of the potential HWSAs is needed to document source waste characteristics of the site and to verify that hazardous substances are present.
- A release to groundwater is possible but not likely. Sampling of the subsurface soils and groundwater is required to document the presence and likelihood of groundwater contamination.

SECTION 8 REFERENCES

1. Latitude and Longitude Calculation Worksheet, Roy F. Weston, Inc., 22 March 1993.
2. 7.5 Minute Quadrangle Topographic Map, United States Department of the Interior, Geological Survey, Aldine Series, Humble Series, Houston Heights Series, Settegast Series, 1984.
3. "1st Unilateral Administrative Order for Removal Response Activities", United States Environmental Protection Agency - Region 6, CERCLA, Docket No. CERCLA 6-08-93. A property plat is also included.
4. Potential Hazardous Waste Site Identification Form, Gary W. Guerra, Onsite Coordinator, 5 February 1992.
5. Site Access Letter and Consent for Access to Property Agreement, from Environmental Protection Agency to Mr. Ray Dove, 15 February 1993.
6. Phone Conversation Record, Jeff Wormser of Roy F. Weston, Inc. and Stacey Bennett of Environmental Protection Agency, 12 May 1993.
7. Field Logbook Notes, Roy F. Weston, Inc., 20 May 1993.
8. Site Reconnaissance Checklist, Roy F. Weston, Inc., 20 May 1993.
9. Interoffice Memorandum - Request for State Funded Cleanup: 11548 East Hardy, Houston, Texas 77093, Robert Musick, Field Investigator, District 7 of the Texas Water Commission to Ernest Heyer, Chief, Field Support Section, Field Operations Division of the Texas Water Commission, 31 October 1991.
10. "Investigation Report - 11548 East Hardy", Patrick E. Pendleton, Harris County Pollution Control Department, 1 February 1991.
11. Harris County Pollution Control Department Complaint, Anonymous, 31 January 1991.

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12. "Investigation Report - 11532 East Hardy", Patrick E. Pendleton, Harris County Pollution Control Department, 1 February 1991.
13. "Investigation Report - 11532 and 11548 East Hardy Road", Paul D. Gibbins, Harris County Pollution Control Department, 28 March 1991.
14. "Site Assessment Report for Card Blanc Salvage Site", Ecology and Environment, Inc., 31 January 1992.
15. "Draft Removal Funded Report for Card Blanc/Carter Site", Ecology and Environment, Inc., 18 June 1993.
16. "Site Assessment Report for Card Blanc Salvage", Ecology and Environment, Inc., 30 September 1992.
17. Geologic Atlas of Texas (Beaumont Sheet), Bureau of Economic Geology, The University of Texas at Austin, February 1968.
18. "The Geology of Texas, Volume I, Stratigraphy", Bureau of Economic Geology, The University of Texas at Austin, Seventh Printing 1978.
19. "The State of Texas Water Quality Inventory", Texas Department of Water Resources, 6th Edition, 1982.
20. "Report 236: Stratigraphic and Hydrogeologic Framework of Part of the Coastal Plain of Texas", United States Geological Survey and Texas Department of Water Resources, July 1979.
21. "Climatic Atlas of Texas", Texas Department of Water Resources, December 1983.
22. "Handbook - Groundwater", United States Environmental Protection Agency, Office of Research and Development, March 1987.

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23. Water Well Location Maps, Texas Water Commission, July 1991.
24. Phone Conversation Record, Jeff S. Wormser of Roy F. Weston, Inc. and the Harris County Subsidence District, 7 July 1993.
25. 30 x 60 Minute Map (Scale 1:100,000), United States Department of the Interior, Geological Survey, Conroe d Houston, 1985.
26. 2-Year 24-Hour Rainfall Map, United States Department of Commerce, 1961.
27. 7.5 Minute Quadrangle Wetlands Inventory Map, United States Department of the Interior, Geological Survey, S Jacinto Series, 1984.
28. Harris County Endangered Species d Sensitive Environments, United States Department of Interior, Fish d Wildlife Services, Houston, Texas, 1 May 1992.
29. Soil Survey of Harris County, Texas, United States Department of Agriculture, Soil Conservation Service, 30 May 1989.
30. "1990 Census of Population d Housing, Summary Population d Housing Characteristics, Texas", United States Department of Commerce, Economics and Statistics Administration, August 1991.
31. Geographical Exposure Modelling System, United States Environmental Protection Agency.

APPENDIX A

PHOTOGRAPH DOCUMENTATION



Site Name: CARD BLANC/CARTER
 Site Location: 11532 and 11548 East Hardy Road, Houston, TX
 Cerclis I.D. No.: TXD988061446
 Weston Work Order No.: 04603-022-034-2400
 Photographer: Jeff S. Wormser *JSW*
 Witness: Robert J. Ullmer *JSW for RJU*
 Date of Photograph: 20 May 1993
 Description: The direction of the photograph is east. The photograph shows the west side of Building #1.



Site Name: CARD BLANC/CARTER
 Site Location: 11532 and 11548 East Hardy Road, Houston, TX
 Cerclis I.D. No.: TXD988061446
 Weston Work Order No.: 04603-022-034-2400
 Photographer: Jeff S. Wormser *JSW*
 Witness: Robert J. Ullmer *JSW for RSU*
 Date of Photograph: 20 May 1993
 Description: The direction of the photograph is northeast. The photograph shows a pile of treated timbers in the foreground. Building #1 is shown in the background.



Site Name: CARD BLANC/CARTER
 Site Location: 11532 and 11548 East Hardy Road, Houston, TX
 Cerclis I.D. No.: TXD988061446
 Weston Work Order No.: 04603-022-034-2400
 Photographer: Jeff S. Wormser *QSW*
 Witness: Robert J. Ullmer *QSW for RJU*
 Date of Photograph: 20 May 1993
 Description: The direction of the photograph is southeast. The photograph shows a scrap pile located in the eastern portion of the Card Blanc property.



Site Name: CARD BLANC/CARTER
 Site Location: 11532 and 11548 East Hardy Road, Houston, TX
 Cerclis I.D. No.: TXD988061446
 Weston Work Order No.: 04603-022-034-2400
 Photographer: Jeff S. Wormser *JSW*
 Witness: Robert J. Ullmer *JSW for RJU*
 Date of Photograph: 20 May 1993
 Description: The direction of the photograph is southwest. The photograph shows the abandoned house located on the Carter property.



Site Name: CARD BLANC/CARTER
 Site Location: 11532 and 11548 East Hardy Road, Houston, TX
 Cerclis I.D. No.: TXD988061446
 Weston Work Order No.: 04603-022-034-2400
 Photographer: Jeff S. Wormser *JSW*
 Witness: Robert J. Ullmer *RJU for RJA*
 Date of Photograph: 20 May 1993
 Description: The direction of the photograph is south. The photograph shows north bound traffic flow on East Hardy Road.



Site Name: CARD BLANC/CARTER
 Site Location: 11532 and 11548 East Hardy Road, Houston, TX
 Cerclis I.D. No.: TXD988061446
 Weston Work Order No.: 04603-022-034-2400
 Photographer: Jeff S. Wormser *JSW*
 Witness: Robert J. Ullmer *JSW for RUU*
 Date of Photograph: 20 May 1993
 Description: The direction of the photograph is north. The photograph shows north bound traffic on East Hardy Road.

APPENDIX B

REFERENCES

REFERENCES

REFERENCE 1

LATITUDE AND LONGITUDE CALCULATION WORKSHEET
USING GEOGRAPHIC INFORMATION SYSTEM AND ArcCAD

SITE NAME: CARD/BLANC CARTER CERCLIS #: TXD 988061446

AKA: _____ SSID: _____

ADDRESS: _____

CITY: HOUSTON STATE: TEXAS ZIP CODE: _____

SITE REFERENCE POINT: _____

USGS QUAD MAP NAME: HUMBLE TOWNSHIP: _____ N/S RANGE: _____ E/W

SCALE: 1:24,000 MAP DATE: 1984 SECTION: _____ 1/4 _____ 1/4 _____ 1/4

MAP DATUM: 1927 1983 (CIRCLE ONE) MERIDIAN: _____

COORDINATES FROM CONTROL POINT #1 (NORTHWEST 2.5' GRID TICK)

LONGITUDE: 95° 20' 00" LATITUDE: 29° 57' 30"

COORDINATES FROM CONTROL POINT #2 (SOUTHWEST 2.5' GRID TICK)

LONGITUDE: 95° 20' 00" LATITUDE: 29° 55' 00"

COORDINATES FROM CHECK POINT #3 (NORTHEAST 2.5' GRID TICK)

LONGITUDE: 95° 17' 30" LATITUDE: 29° 57' 30"

COORDINATES FROM CHECK POINT #4 (SOUTHEAST 2.5' GRID TICK)

LONGITUDE: 95° 17' 30" LATITUDE: 29° 55' 00"

1. INPUT FILE A:\CARD\BLAN\INPUT1
2. OUTPUT FILE A:\CARD\BLAN\OUTPUT1
3. INPUT FILE A:\CARD\BLAN\INPUT2
4. OUTPUT FILE A:\CARD\BLAN\OUTPUT2

SITE LATITUDE: 29° 53' 19.43"

SITE LONGITUDE: 95° 21' 54.10"

INVESTIGATOR: _____ DATE: _____

CAD OPERATOR PETE BULOT DATE: MARCH 22, 1993

- 1) THE GEOGRAPHIC INFORMATION SYSTEM (GIS) AND ArcCAD WERE USED TO CALCULATE SITE LATITUDE AND LONGITUDE.
- 2) COORDINATE FILE PRINTOUT IS ATTACHED.

CARD-BLANK CARTER

A:\CARDBLAN>TYPE INPUT1

95 20 00	29 57 30	&rem CONTROL POINT 1
95 20 00	29 55 00	&rem CONTROL POINT 2

A:\CARDBLAN>TYPE OUTPUT1

3160930.6633	790841.8878	&rem CONTROL POINT 1
3161405.6257	775697.5784	&rem CONTROL POINT 2

A:\CARDBLAN>TYPE INPUT2

3160930.6633	790841.8878	&rem CONTROL POINT 1
3161405.6257	775697.5784	&rem CONTROL POINT 2
3174139.2999	791255.2161	&rem CHECK POINT 3
3174600.1913	776110.3050	&rem CHECK POINT 4
3151685.0747	765230.3924	&rem SITE LOCATION

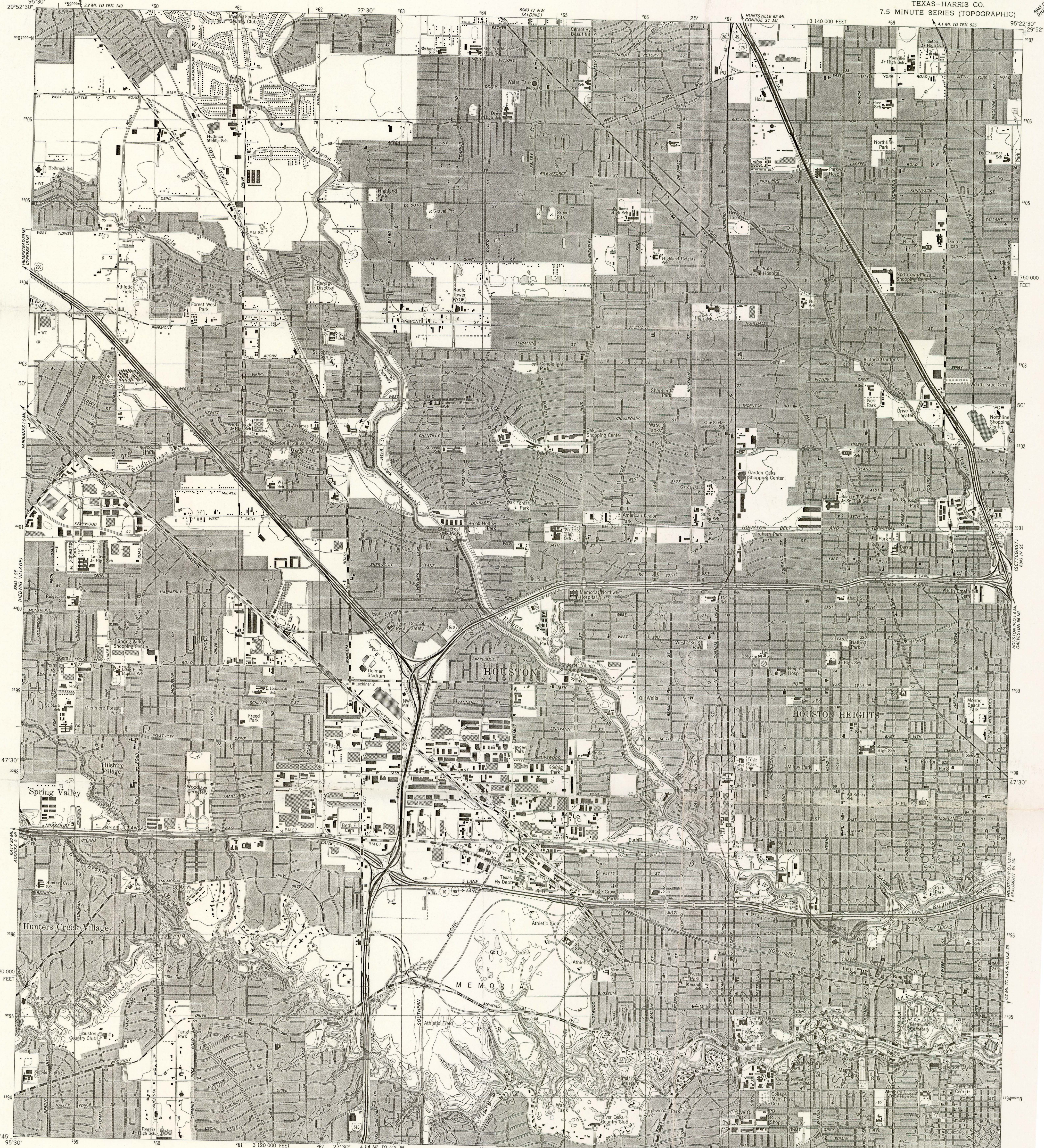
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95 20 0.00	29 55 0.00	&rem CONTROL POINT 2
95 17 29.77	29 57 29.97	&rem CHECK POINT 3
95 17 29.99	29 54 59.97	&rem CHECK POINT 4
95 21 54.10	29 53 19.43	&rem SITE LOCATION

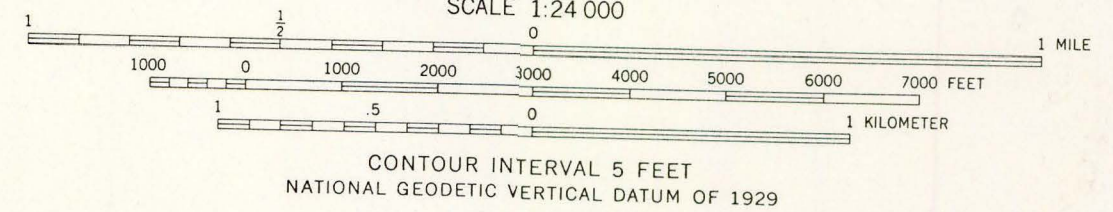
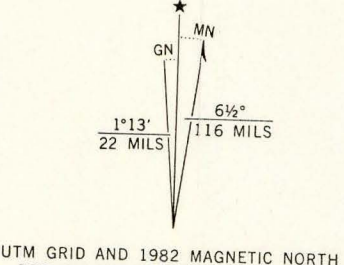
A:\CARDBLAN>

REFERENCE 2

T . . .



Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs
taken 1976. Field checked 1976. Map edited 1982
Projection and 10,000-foot grid ticks: Texas
coordinate system, south central zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 15
1927 North American datum
To place on the predicted North American Datum 1983
move the projection lines 20 meters south and
22 meters east as shown by dashed corner ticks
Red tint indicates areas in which only landmark buildings are shown
A portion of this map lies within a subsidence area
Contouring based on 1973 adjustment of vertical control



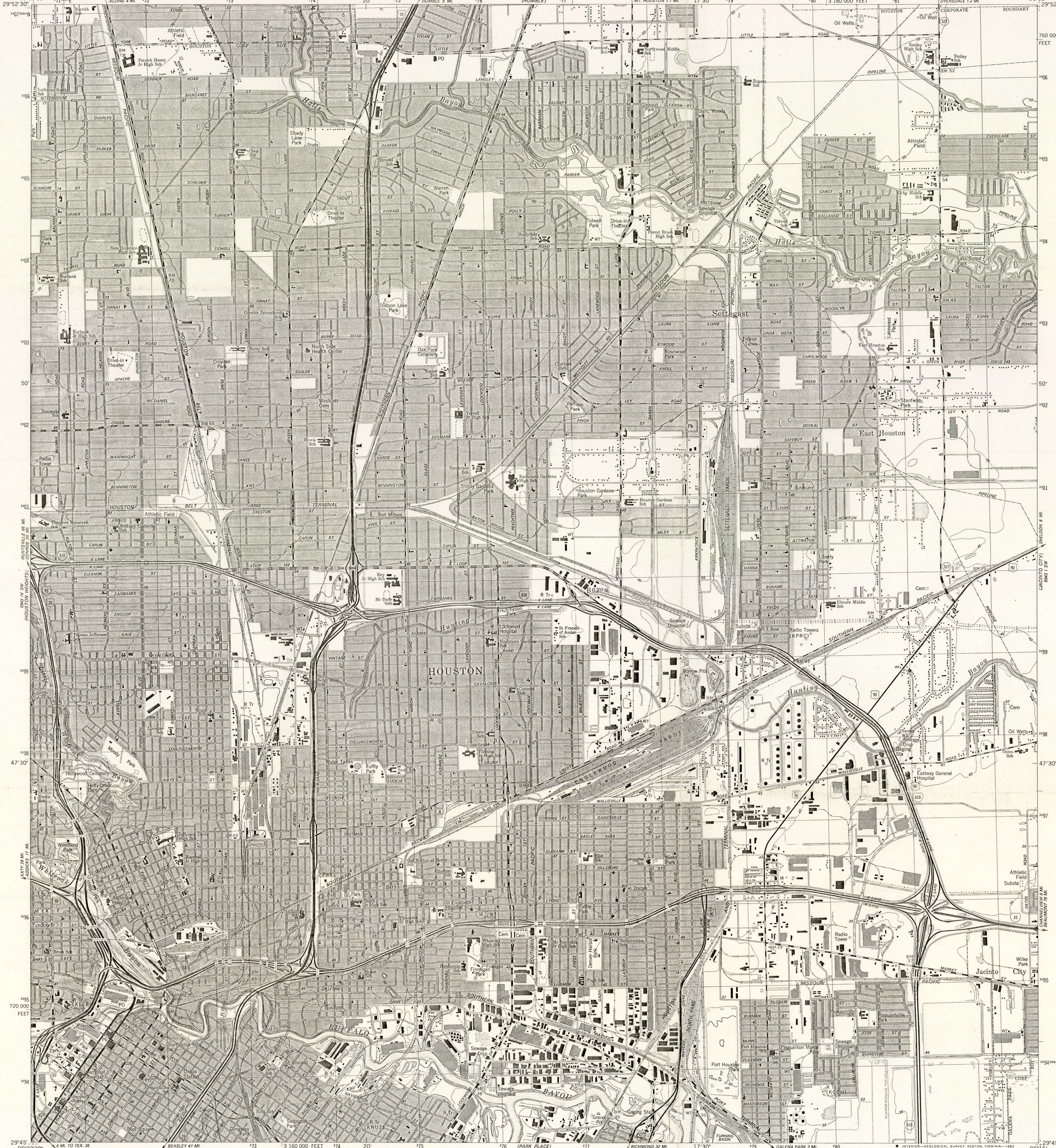
SOLD BY
GAYLORD STICKLE CO. & ASSOC., INC.
Authorized Agents For U.S. Geological Survey Maps
Houston, Texas
529-3471



ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U.S. Route
State Route

HOUSTON HEIGHTS, TEX.
N2945-W9522.5/7.5
1982

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1976. Field checked 1976. Map edited 1982

Projection and 10,000-foot grid ticks: Texas coordinate system, south central zone (Lambert conformal conic) 1000-meter Universal Transverse Mercator grid, zone 15 1927 North American datum

To place on the predicted North American Datum 1983 move the projection lines 20 meters south and 22 meters east as shown by dashed corner ticks

Red tint indicates areas in which only landmark buildings are shown

A portion of this map lies within a subsidence area

Contouring based on 1973 adjustment of vertical control

UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1°09' 20" M 116° M

1 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 5 10 KILOMETER

CONTOUR INTERVAL 5 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS

FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

TEXAS

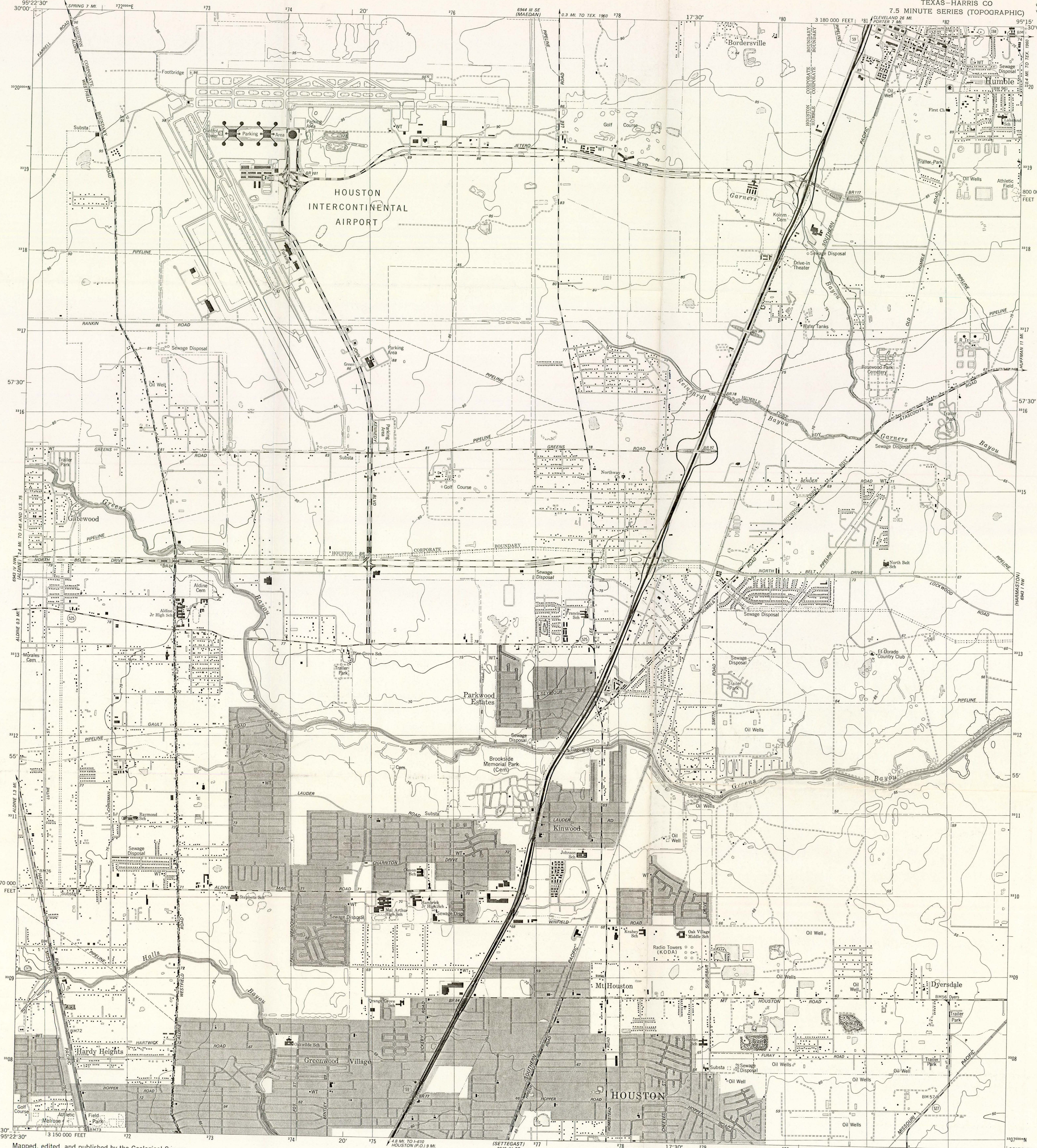
2995-431

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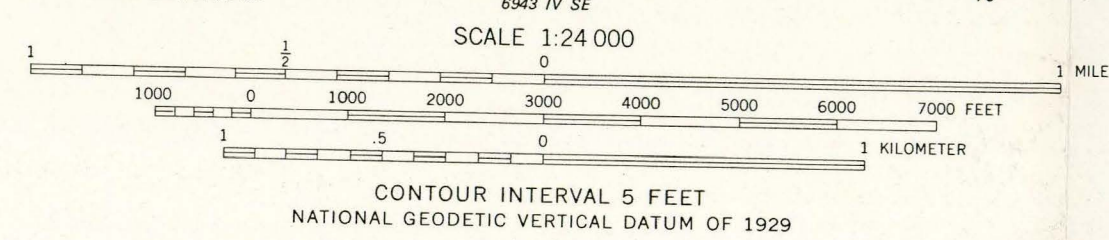
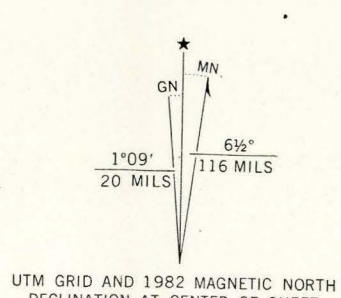
SETTEGAST, TEX.
N2945-W9515/7.5

1982

DMA 6943 IV SE-SERIES V882



Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs
taken 1976. Field checked 1976. Map edited 1982
Projection and 10,000-foot grid ticks: Texas
coordinate system, south central zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 15
1927 North American datum
To place on the predicted North American Datum 1983
move the projection lines 20 meters south and
22 meters east as shown by dashed corner ticks
Fine red dashed lines indicate selected fence lines
Red tint indicates areas in which only landmark buildings are shown
A portion of this map lies within a subsidence area
Contouring based on 1973 adjustment of vertical control

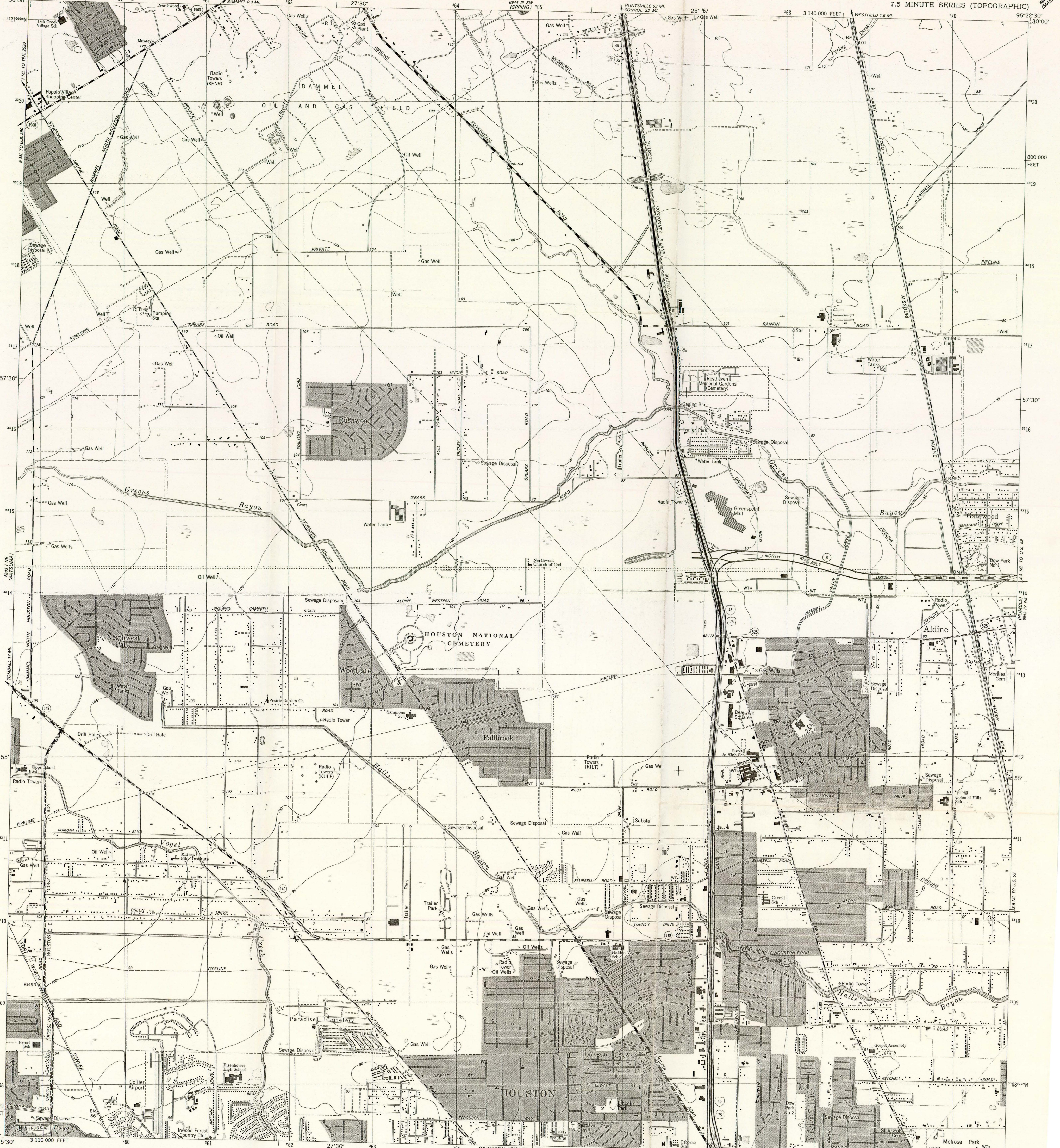


ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

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HUMBLE, TEX.
N2952.5-W9515/7.5

1982
DMA 6943 IV NE-SERIES V882



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Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs
taken 1976. Field checked 1976. Map edited 1982

Projection and 10,000-foot grid ticks: Texas
coordinate system, south central zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 15
1927 North American datum
To place on the predicted North American Datum 1983
move the projection lines 20 meters south and
22 meters east as shown by dashed corner ticks
Fine red dashed lines indicate selected fence lines
Red tint indicates areas in which only landmark buildings are shown
A portion of this map lies within a subsidence area
Contouring based on 1973 adjustment of vertical control
There may be private inholdings within the boundaries of
the National or State reservations shown on this map

UTM GRID AND 1982 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
(HOUSTON HEIGHTS) 6943 IV SW

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION

Primary highway, hard surface	Light-duty road, hard or improved surface
Secondary highway, hard surface	Unimproved road
Interstate Route	U.S. Route
	State Route

TEXAS

QUADRANGLE LOCATION

ALDINE, TEX.
N2952.5-W9522.5/7.5

1982

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2995-433

DMA 6943 IV NW-SERIES V882

REFERENCE 3

T/1 19 -E

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 6

IN THE MATTER OF

The Card Blanc Carter Site
Houston Harris County
Texas

1ST
UNILATERAL ADMINISTRATIVE
ORDER FOR REMOVAL RESPONSE
ACTIVITIES

RESPONDENTS
Craig McLerran
Jesse Jackson
Charles Pete Miller and
Ray Dove

U S EPA Region 6
CERCLA
Docket No CERCLA 6-08-93

Proceeding under section 106(a)
of the Comprehensive
Environmental Response
Compensation and Liability Act
of 1980 as amended
42 U S C §9606(a)

I JURISDICTION AND GENERAL PROVISIONS

- 1 This Order is issued pursuant to the authority vested in the President of the United States by section 106(a) of the Comprehensive Environmental Response Compensation and Liability Act of 1980 42 U S C § 9606(a) as amended by the Superfund Amendments and Reauthorization Act of 1986 Pub L 99-499 (CERCLA) and delegated to the Administrator of the United States Environmental Protection Agency (EPA) by Executive Order No 12580 January 23 1987 52 Federal Register 2926 and further delegated to the Regional Administrators by U S EPA Delegation Nos 14-14-A and 14-14-B and to the Director of the Hazardous Waste Management Division Region 6 by U S EPA Delegation No R6-14-14-B
- 2 This Order pertains to property located on an approximately 3 acre lot located in a rural area of northern Harris County

inside an active salvage yard known as Card Blanc Salvage hereinafter referred to as the The Card Blanc Carter Site or the Site This Order requires the Respondents to undertake and complete removal activities described herein to abate an imminent and substantial endangerment to the public health welfare or the environment that may be presented by the actual or threatened release of hazardous substances at or from the Site

- 3 EPA has notified the State of Texas of this action pursuant to section 106(a) of CERCLA 42 U S C § 9606(a)

II PARTIES BOUND

- 4 This Order applies to and is binding upon Respondents and their heirs receivers trustees successors and assigns Any change in ownership or corporate status of a Respondent including but not limited to any transfer of assets or real or personal property shall in no way alter such Respondent s responsibilities under this Order Respondents are jointly and severally liable for carrying out all activities required by this Order The compliance or noncompliance by one or more Respondents with any or all provision of this Order shall not in any way excuse or justify noncompliance by any other Respondent
- 5 Respondents shall ensure that their contractors subcontractors and representatives comply with this Order Respondents shall be responsible for any

noncompliance

III DEFINITIONS

- 6 Unless otherwise expressly provided herein terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in the statute or its implementing regulations Whenever terms listed below are used in this Order or in the documents attached to this Order or are incorporated by reference into this Order the following definitions shall apply
- a ARARs shall mean all applicable local State and Federal laws and regulations and all applicable requirements or relevant and appropriate requirements as those terms are described at 40 CFR § 300.415 and 42 U S C § 9621(d)
 - b CERCLA shall mean the Comprehensive Environmental Response Compensation and Liability Act of 1980 as amended 42 U S C § 9601 et seq
 - c Day shall mean calendar day unless expressly stated to be a business day Business day shall mean a day other than a Saturday Sunday or Federal holiday In computing any period of time under this Order where the last day would fall on a Saturday Sunday or Federal holiday the period shall run until the end of the next business day
 - d EPA shall mean the United States Environmental Protection Agency

- e National Contingency Plan or NCP shall mean the National Contingency Plan promulgated pursuant to § 105 of CERCLA 42 U S C § 9605 codified at 40 C F R Part 300 including any amendments thereto
- f Order shall mean this document and all attachments hereto and any further submittal(s) required pursuant to this Order Such further submittal(s) shall be incorporated into and become a part of this Order upon final written approval by EPA of such submittal(s)
- g Paragraph shall mean a portion of this Order identified by an Arabic numeral
- h Removal Action shall mean those activities to be undertaken by Respondents pursuant to this Order and as further described in the Statement of Work
- i Statement of Work or SOW shall mean the statement of work for implementation of the Removal Action at the Site which statement of work is an attachment to this Order The Statement of Work is incorporated into this Order and is an enforceable part of this Order
- j Section shall mean a portion of this Order identified by a Roman numeral and including one or more paragraphs
- k Site shall mean the Card Blanc Carter Site as described in Paragraph 2 of this Order
- l State shall mean the State of Texas
- m Submittal includes all written information Respondents are required to produce and submitted to EPA pursuant to the terms of this Order including but not limited to

correspondence tasks plans reports deliverables
specifications and schedules

n United States shall mean the United States of
America

o Work shall mean all activities Respondents are
required to perform under or pursuant to this Order and
any attachments or incorporations hereto

IV FINDINGS OF FACT

- 7 The Site is located within an active salvage yard at
11548 East Hardy Road in Houston Harris County Texas
The Site contains approximately 250 containers of
assorted industry waste Access to Card Blanc Salvage
is restricted to the general public However Card
Blanc Salvage is frequented by employees and patrons who
are allowed access to all areas of the Card Blanc
Salvage facility This includes the Site area where the
abandoned containers are presently stored Children
have been observed playing in and around the Site area
The legal description of the Site is as follows
Lot twenty-five (25) of HAHN-SITES SUBDIVISION in the Martin
K Snell Survey in Harris County Texas according to the map
thereof recorded in volume 13 page 32 of the Map Records of
Harris County Texas
- 8 EPA conducted a site assessment at the Site on January 2
1992 During the assessment EPA representatives discovered
approximately 250 assorted containers of hazardous waste
(corrosives and ignitables) and listed hazardous

substances Among the hazardous wastes and substances that have been identified are

- A Glacial Acetic Acid
- B Furfuryl Alcohol
- C Formaldehyde
- D Paraformaldehyde
- E Sulfur
- F Ammonium Chloride
- G Barium Chloride

- 9 On September 29 1992 The Region 6 Environmental Services Division Director signed an Action Memorandum declaring that conditions at the Site constituted an imminent and substantial endangerment to the public health or welfare or the environment
- 10 Pursuant to its authority under the Action Memorandum EPA conducted a stabilization action at the Site The action included hazardous characterization and compatibility sampling and overpacking of deteriorating containers
- 11 Many of the containers located at the Site have leaked rusted or been damaged permitting hazardous wastes and hazardous substances from the containers to be released into the soil
- 12 Respondents Craig McLerran Jesse Jackson and Charles Miller purchased the hazardous wastes and hazardous substances identified in paragraph 8 above and arranged to have it transported to Card Blanc Salvage for storage at the site

- 13 Respondent Ray Dove owned and operated a business known as
Card Blanc Salvage represented by Ray Dove that received the
hazardous waste and substances identified in paragraph 8
above

V CONCLUSIONS OF LAW AND DETERMINATIONS

- 14 Based on the Findings of Fact set forth above EPA determines
that
- 15 The Card Blanc Carter Site is a facility as defined by
section 101(9) of CERCLA 42 U S C § 9601(9)
- 16 Each of the hazardous waste and hazardous substance
identified in paragraph 8 above is a hazardous substance as
defined by section 101(14) of CERCLA 42 U S C § 9601(14)
- 17 Each Respondent is a person as defined by section 101(21)
of CERCLA 42 U S C § 9601(21)
- 18 Respondents McClerran Jackson and Miller are generators as
defined by section 101(20) of CERCLA 42 U S C § 9601(20)
and within the meaning of section 107(a)(1) of CERCLA
- 19 Respondent Ray Dove is a operator as defined by section 101
(20) of CERCLA 42 U S C § 9601(20) and within the meaning
of section 107(a) (1) of CERCLA
- 20 Respondents are liable persons under section 107(a) of
CERCLA 42 U S C § 9607(a)
- 21 The conditions described in paragraph 11 above
constitute an actual or threatened release into the
environment as defined by sections 101(8) and (22) of
CERCLA 42 U S C §§ 9601(8) and (22)
- 22 The conditions present at the Site constitute a threat to

public health or welfare or the environment based upon consideration of the factors set forth in section 300 415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan as amended 40 CFR Part 300 as amended (NCP) These factors include but are not limited to the following

- a actual or potential exposure to hazardous substances by nearby human populations animals or the food chain from hazardous substances pollutants or contaminants
- b The presents of hazardous substances or pollutants or contaminants in the soils largely at or near the surface

- 23 The actual or threatened release of hazardous substances from the Site presents an imminent and substantial endangerment to the public health welfare or the environment pursuant to section 106(a) of CERCLA 42 U S C § 9606(a)
- 24 These removal actions required by this Order are necessary to protect the public health welfare and the environment The removal actions required by this Order if promptly and properly performed will be consistent with the NCP and CERCLA

VI ORDER

- 25 Based upon the foregoing Findings of Fact Conclusions of Law and Determinations for this Site EPA hereby Orders that Respondents perform the following actions within

one-hundred and twenty (120) days of the effective date of this Order

- a Develop and submit to EPA for review and approval a plan (hereinafter called workplan) to conduct a removal action at the Site
- b The workplan shall set forth in detail the Respondent s plan to conduct and complete the work activities set forth in Attachment A (Statement of Work) to this Order
- c Following EPA approval of the workplan respondents shall implement the workplan

VII Notice of Intent to Comply

- 26 Respondents shall notify the EPA representatives identified in paragraph 56 of this Order in writing within two (2) days after the effective date of this Order of Respondent s irrevocable intent to comply with this Order Failure of each Respondent to provide such notification within this time period shall be a violation of this Order

VIII Designation of Contractor, Project Coordinator, and On-Scene Coordinator

- 27 Respondents shall retain a contractor to implement this Removal Action Respondents shall notify EPA by certified or express mail of the name and qualifications of such contractor within seven (7) business days of the effective date of this Order Respondents shall also notify EPA of the name and qualifications of any other contractors or subcontractors retained to perform work

under this Order at least seven (7) days prior to commencement of such work EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by the Respondents If EPA disapproves of a selected contractor Respondents shall retain a different contractor within five (5) business days following EPA s disapproval and shall notify EPA of that contractor s name and qualifications within five (5) business days of EPA s disapproval

- 28 Within seven (7) days after the effective date of this Order the Respondents shall designate a Project Coordinator who shall be responsible for administration of all the Respondents actions called for and required by the Order Within five (5) days Respondents shall submit the designated coordinator s name address telephone number and qualifications to EPA To the greatest extent possible the Project Coordinator shall be present onsite or readily available during Site work EPA retains the right to disapprove of any Project Coordinator named by the Respondents If EPA disapproves of a selected Project Coordinator Respondents shall retain a different Project Coordinator within five (5) business days following EPA s disapproval and shall notify EPA of that person s name and qualifications within five (5) business days Receipt by the Respondents Project Coordinator of any notice or communication from EPA relating to this Order

shall constitute receipt by all Respondents

- 29 The EPA has designated Mr Mike Williams of the EPA Emergency Response Branch as its OSC Respondents shall direct all submissions required by this Order to the OSC at

Mr Mike Williams
U S Environmental Protection Agency
Region 6
Emergency Response Branch (6E-ES)
1445 Ross Ave
Dallas Texas 75202
(214) 655-2275
FAX # 655-7447

by certified or express mail

IX Work to Be Performed

- 30 Respondents shall perform at a minimum those response activities as outlined in the attached Statement of Work and the workplan as approved by EPA which involves the removal and proper disposal of any hazardous substances pollutants or contaminants currently contained in drums or other containers at the Site investigate the nature and extent of soil contamination at the Site and any off-site contamination caused by releases from the Site properly remove hazardous substances pollutants or contaminants and any soil non-hazardous materials or structures which have been contaminated to achieve the applicable cleanup levels and replace any removed soil with clean soil and grade to original contour

X Workplan and Implementation

- 31 Within seven (7) days after the effective date of this Order the Respondents shall submit to EPA for approval of a draft workplan for performing the removal activities as

set forth above The draft workplan shall provide a description of and an expeditious schedule for the activities required by this Order

- 32 EPA may approve disapprove require revisions to or modify the draft workplan If EPA requires revisions Respondents shall submit a revised draft workplan within five (5) days of notification Respondents shall implement the workplan as finally approved in writing by EPA in accordance with the schedule approved by EPA Once approved the workplan and any subsequent modifications shall be incorporated into and fully enforceable under this Order

- 33 After the effective date of this Order the commencement or undertaking of any Removal Actions by Respondents without EPA approval is a violation of this Order

XI Health and Safety Plan

- 34 The Respondents shall submit a plan that ensures the protection of the public health and safety during performance of onsite work under this Order for EPA review and comment within seven (7) days after the effective date of this Order This plan shall satisfy or comply with among other things applicable Occupational Safety and Health Administration (OSHA) Regulations found at 29 CFR Part 1910 Respondents shall incorporate all changes to the plan recommended by EPA and implement the plan incorporating any comments received by EPA during the pendency of the Removal

Action**XII Quality Assurance and Sampling**

- 35 All sampling and analyses performed pursuant to this Order shall conform to EPA direction approval and guidance regarding sampling quality assurance/quality control (QA/QC) data validation and chain of custody procedures Respondents shall ensure that the laboratory used to perform analyses participates in a QA/QC program that complies with the appropriate EPA guidance Upon request by EPA Respondents shall have such a laboratory analyze samples submitted by EPA for quality assurance monitoring Respondents shall provide to EPA the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis
- 36 Upon request by EPA Respondents shall allow EPA or its authorized representatives to take split samples and/or duplicate samples of any samples collected by Respondents while performing work under this Order Respondents shall notify EPA not less than five (5) days in advance of any sample collection activity In addition EPA shall have the right to take any additional samples that it deems necessary
- 37 Respondents must adhere to the guidelines in the following documents for QA/QC and sampling Quality Assurance/Quality Control Guidance for Removal Activities Sampling QA/QC Plan and Data Validation

Procedures OSWER Directive Number 9360 4-01
 Environmental Response Team Standard Operating
 Procedures OSWER Directive Numbers 9360 4-02 through
 9360 4-08 and the draft Representative Sampling
 Guidance for soil air ecology waste and water as
 this information becomes available

XIII Reporting

- 38 Respondents shall submit a written progress report to EPA concerning activities undertaken pursuant to this Order every seventh (7th) day subsequent to the date of receipt of EPA's approval of the workplan and until termination of this Order unless otherwise directed by the OSC. These reports shall describe all significant developments during the preceding period including the work performed and any problems encountered analytical data received during the reporting period and the developments anticipated during the next reporting period including a schedule of work to be performed anticipated problems and planned resolutions of past or anticipated problems

XIV Final Report

- 39 Within ten (10) days after completion of all response actions required under this Order the Respondents shall submit for EPA review and approval a final report summarizing the actions taken to comply with this Order. The final report shall conform to at a minimum the requirements set forth in section 300.165 of the NCP (OSC Reports)

The final report shall include a good faith estimate of total costs incurred in complying with the Order a listing of quantities and types of materials removed a discussion of removal and disposal options considered for those materials a listing of the ultimate destination of those materials a presentation of the analytical results of all sampling and analyses performed and accompanying appendices containing all relevant paperwork generated during the response action (e.g. manifests invoices bills contracts and permits)

- 40 The final report shall also include the following certification signed by a person who supervised or directed the preparation of that report

Under penalty of law I certify that based on personal knowledge and appropriate inquiries of all relevant persons involved in the preparation of the report the information submitted is true accurate and complete to the best of my knowledge and belief The information contained in or accompanying this Notice of Completion is true accurate and complete As to (the) (those) identified portion(s) of this Notice of Completion for which I cannot personally verify (its) (their) truth and accuracy I certify as the official having supervisory responsibility for the person(s) who acting under my direct instructions made the verification that this information is true accurate and complete

XV Access to Property and Information

- 41 Respondents shall provide and/or obtain access to the Site and appropriate off-site areas and provide access to all records and documentation related to the conditions at the Site and the activities conducted pursuant to

this Order Such access shall be provided to EPA employees contractors agents consultants designees representatives and the State of Texas representatives These individuals shall be permitted to move freely at the Site and appropriate off-site areas in order to conduct activities which the EPA determines to be necessary Respondents shall submit to EPA upon request the results of all sampling or tests and all other data generated by the Respondents or their contractors or on the Respondents' behalf in the course of implementation of this Order

42 Within five (5) days after the effective date of this Order or as otherwise specified in writing by the OSC Respondents shall obtain all necessary access agreements if the Site or any other areas where work under this Order is to be performed is owned by or in possession of someone other than the Respondents

43 Respondents shall immediately notify EPA after using their best efforts they are unable to obtain such agreements Respondents shall describe in writing their efforts to obtain access EPA may then assist Respondents in gaining access to the extent necessary to effectuate the response activities described herein using such means as EPA deems appropriate

XVI Record Retention, Documentation, Availability of Information

- 44 Respondents shall preserve all documents and information relating to the work performed under this Order or relating to the hazardous substances found on or released from the Site for six (6) years following completion of the response activities required by this Order At the end of this six (6) year period and before any documents or information are destroyed Respondents shall notify EPA that such documents and information are available to EPA for inspection and upon request shall provide the original or copies of such documents and information to EPA In addition Respondents shall provide documents and information retained under this Section at any time before expiration of the six (6) year period at the written request of EPA
- 45 Respondents may assert a business confidentiality claim pursuant to 40 C F R § 2 204(b) with respect to part or all of any information they submit to EPA pursuant to this Order provided such claim is allowed by section 104(e)(7) of CERCLA 42 U S C § 9604(e)(7) Analytical and other data specified in section 104(e)(7)(F) of CERCLA shall not be claimed as confidential by the Respondents EPA shall only disclose information covered by a business confidentiality claim to the extent permitted by and by means of the procedures set forth at 40 C F R Part 2 Subpart B If no such claim accompanies the information when it is received by

EPA EPA may make it available to the public without further notice to Respondents

XVII Off-Site Policy

- 46 All hazardous substances pollutants or contaminants removed off-site pursuant to this Order for treatment storage or disposal shall be treated stored or disposed of at a facility in compliance with the EPA Revised Off-Site Policy OSWER Directive Number 9834 11 November 13 1987 promulgated pursuant to 42 U S C § 9621(d)(3) as determined by the OSC

XVIII Compliance With Other Laws

- 47 In accordance with 40 C F R § 300 415(i) all onsite actions required pursuant to this Order shall to the extent practicable as determined by EPA considering the exigencies of the situation attain applicable or relevant and appropriate requirements (ARARs) under Federal environmental State environmental or facility siting laws All actions required pursuant to this Order shall be performed in accordance with all other applicable local State and Federal laws and regulations

XIX Emergency Response and Notification of Releases

- 48 Upon the occurrence of any incident or change in Site conditions during the activities conducted pursuant to this Order that causes or threatens an additional release of hazardous substances from the Site or an endangerment to the public health welfare or the environment the Respondents shall immediately take all

appropriate action to prevent abate or minimize such release or endangerment caused or threatened by the release The Respondents shall also immediately notify the OSC or in the event of his unavailability shall notify the Region 6 Duty Officer at the EPA Regional Emergency 24-hour telephone number (214) 655-2222 of the incident or Site conditions

- 49 In addition in the event of an actual release of a hazardous substance Respondents shall immediately notify EPA s OSC and the National Response Center at telephone number (800) 424-8802 Respondents shall submit a written report to EPA within five (5) days after each release setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release

XX AUTHORITY OF THE EPA ON-SCENE COORDINATOR (OSC)

- 50 The OSC shall be responsible for overseeing the implementation of this Order The OSC shall have the authority vested in an OSC by the NCP at 40 CFR Part 300 as amended including the authority to halt conduct or direct any work required by this Order or to direct any other response action undertaken by EPA or the Respondents at the Site Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC

51 EPA and the Respondents shall have the right to change their designated OSC or Project Coordinator EPA shall notify the Respondents and Respondents shall notify EPA as soon as possible before such a change is made Notification will initially be made orally and shall be followed promptly by written notice within two (2) days

XXI ENFORCEMENT. PENALTIES FOR NONCOMPLIANCE

52 Violation of this Order may subject the Respondents to civil penalties of up to twenty-five thousand dollars (\$25 000) for each day the violation occurs as provided in section 106(b)(1) of CERCLA 42 U S C § 9606(b)(1) The Respondents may also be subject to punitive damages in an amount up to three times the amount of any cost incurred by the United States as a result of such violation as provided in section 107(c)(3) of CERCLA 42 U S C § 9607(c)(3) Should Respondents violate this Order or any portion hereof EPA may carry out the required actions unilaterally pursuant to section 104 of CERCLA 42 U S C § 9604 and/or may seek judicial enforcement of this Order pursuant to section 106 of CERCLA 42 U S C § 9606

XXII REIMBURSEMENT OF OVERSIGHT COSTS

53 Within 180 days after completion of the response action EPA will submit to the Respondents an accounting of all response and oversight costs incurred by the U S Government with respect to this Order Oversight costs shall include all direct and indirect costs incurred by EPA

54 The payment shall be made by mailing a money order cashier s check or certified check payable to the HAZARDOUS SUBSTANCES SUPERFUND within thirty (30) days of the Respondents receipt of EPA s bill to the following address

Regional Hearing Clerk (6C)
U S EPA Region 6
P O Box 360582M
Pittsburgh PA 15251

55 Docket No CERCLA 6-08-93 should be clearly typed on the check to ensure credit

56 Respondent shall send simultaneous notices of such payments including copies of the money order cashier s check or certified check to the following

Mr Carl Bolden
United States Environmental Protection Agency
Region 6
Superfund Enforcement Branch (6H-EC)
1445 Ross Avenue
Dallas Texas 75202-2733
(214) 655-6713
FAX # 655-6460

Mr Michael C Barra
U S Environmental Protection Agency
Region 6
Office of Regional Counsel (6C-WT)
1445 Ross Avenue
Dallas Texas 75202-2733
(214) 655-2143
FAX # 655-2182

57 Your adherence to these procedures will ensure proper credit when payments are received

58 If EPA does not receive payment within thirty (30) days of the due date interest will accrue on the amount due from the due date at the current annual rate prescribed and published by the Secretary of the Treasury in the Federal Register and

the Treasury Fiscal Requirements Manual Bulletin per annum through the date of payment

- 59 The due date is the date or dates specified in the this Order for payment unless the respondent invokes the dispute resolution If dispute resolution is invoked for purposes of interest calculation the due date is the date of final resolution of the dispute
- 60 If payment is overdue EPA will also impose a late-payment handling charge of \$15 with an additional delinquent notice charge of \$15 for each subsequent thirty (30) day period Finally EPA will apply a six (6) percent per annum penalty on any principal amount not paid within ninety (90) days of the due date
- 61 Other penalties for failure to make timely payment may also apply

XXIII RESERVATION OF RIGHTS

- 62 Nothing herein shall limit the power and authority of EPA or the United States to take direct or order all actions necessary to protect public health welfare or the environment or to prevent abate or minimize an actual or threatened release of hazardous substances pollutants or contaminants or hazardous or solid waste on at or from the Site Further nothing herein shall keep EPA from seeking legal or equitable relief to enforce the terms of this Order or from taking other legal or equitable action as it deems appropriate and necessary from requiring the Respondents in the future

to perform additional activities pursuant to CERCLA or any other applicable law

XXIV OTHER CLAIMS

- 63 By issuance of this Order the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents their employees agents contractors subcontractors and any persons acting on behalf or under their control in carrying out activities pursuant to this Order The United States or EPA shall not be held as a party to any contract entered into by the Respondents or their employees agents successors representatives assigns contractors or consultants in carrying out activities pursuant to this Order
- 64 This Order does not constitute preauthorization of funds under section 111(a)(2) of CERCLA 42 U S C § 9611(a)(2)
- 65 Nothing in this Order shall constitute a satisfaction of or release from any claim or cause of action against the Respondents or any person not a party to this Order for any liability such person may have under CERCLA other statutes or the common law including but not limited to any claims of the United States for damages and interest under section 107(a) of CERCLA 42 U S C § 9607(a)

XXV AMENDMENTS TO THE ORDER AND THE WORKPLAN

- 66 This Order but not including the workplan and Statement of Work may be amended in writing by signature of the Regional Administrator or the Regional Administrator's delegate. Amendments to the workplan or Statement of Work may be made in writing by the OSC or at the OSC's oral direction. If the OSC makes an oral modification it will be memorialized in writing within five (5) days; the effective date of the modification shall be the date of the OSC's oral direction.
- 67 If Respondents seek permission to deviate from the approved workplan, Respondents' Project Coordinator shall submit a written request to EPA for approval outlining the proposed workplan modification and its basis.
- 68 No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, or any other writing submitted by the Respondents shall relieve the Respondents of their obligations to obtain such formal approval as may be required by this Order and to comply with all requirements of this Order unless it is formally modified.
- 69 No extensions to the timeframes required by this Order or as specified in an approved workplan shall be granted without sufficient cause. Respondents must request all extensions in writing, and requests shall not be deemed accepted unless approved in writing by EPA.

XXVI ADDITIONAL RESPONSE ACTIONS

- 70 If EPA determines that additional response actions not included in an approved plan are necessary to protect public health welfare or the environment EPA will notify Respondents of that determination Unless otherwise stated by EPA within thirty (30) days of receipt of notice from EPA that additional response activities are necessary to protect public health welfare or the environment Respondents shall submit for approval by EPA a workplan for the additional response activities The plan shall conform to the applicable requirements of sections IX and X of this Order Upon EPA s approval of the plan pursuant to sections IX and X Respondents shall implement the plan for additional response activities in accordance with the provisions and schedule contained therein

XXVII TERMINATION AND SATISFACTION

- 71 When EPA determines after EPA s review of the Final Report that all work has been fully performed in accordance with this Order and that all goals and objectives of this Order and the Statement of Work have been satisfied EPA will provide notice to the Respondents If EPA determines that any removal activities have not been completed in accordance with this Order EPA will notify the Respondents provide a list of the deficiencies and require that Respondents amend the workplan to correct such deficiencies The Respondents

shall implement the amended workplan and shall submit an amended Final Report in accordance with the EPA notice Failure to implement the approved amended workplan will be a violation of this Order

XXVIII ACCESS TO ADMINISTRATIVE RECORD

- 72 The Administrative Record supporting the above Findings of Fact Conclusions of Law and Determinations will be available for review upon completion

XXIX OPPORTUNITY TO CONFER

- 73 Within five (5) days after issuance of this Order Respondents may request a conference with EPA Any such conference shall be held within three (3) days prior to the effective date unless extended by mutual agreement of the parties At any conference held pursuant to the request Respondents may appear in person or be represented by an attorney or other representative
- 74 If a conference is held Respondents may present any evidence arguments or comments regarding this Order Any evidence arguments or comments concerning this Order that Respondents wish to present to EPA should be reduced to writing and submitted to EPA within three (3) days following the conference or within five (5) days of issuance of the Order if no conference is requested This conference is not an evidentiary hearing and does not constitute a proceeding to challenge this Order It does not give Respondents a right to seek review of this Order or to seek resolution of potential liability

Requests for a conference or any written submittals under this paragraph shall be directed to

Mr Michael C Barra
U S Environmental Protection Agency
Region 6
Office of Regional Counsel (6C-WT)
1445 Ross Avenue
Dallas Texas 75202-2733
(214) 655-2143
FAX # 655-2182

XXX INSURANCE

- 75 At least seven (7) days prior to commencing any onsite work under this Order the Respondents shall secure and shall maintain for the duration of this Order comprehensive general liability insurance and automobile insurance with limits of one (1) million dollars each combined single limit The United States shall be named as an insured for all such insurance policies Within the same time period the Respondents shall provide EPA with certificates of such insurance and a copy of each insurance policy If the Respondents demonstrate to EPA that any contractor or subcontractor maintains insurance equivalent to that described above or insurance covering the same risks but in a lesser amount then the Respondents need provide only that portion of the insurance described above which is not maintained by such contractor or subcontractor

XXXI EFFECTIVE DATE

76 This Order shall be effective five (5) days after the Order is signed by the Hazardous Waste Management Director following issuance unless a conference is requested as provided herein. If a conference is requested this Order shall be effective on the third (3rd) day following the day of the conference unless modified in writing by EPA.

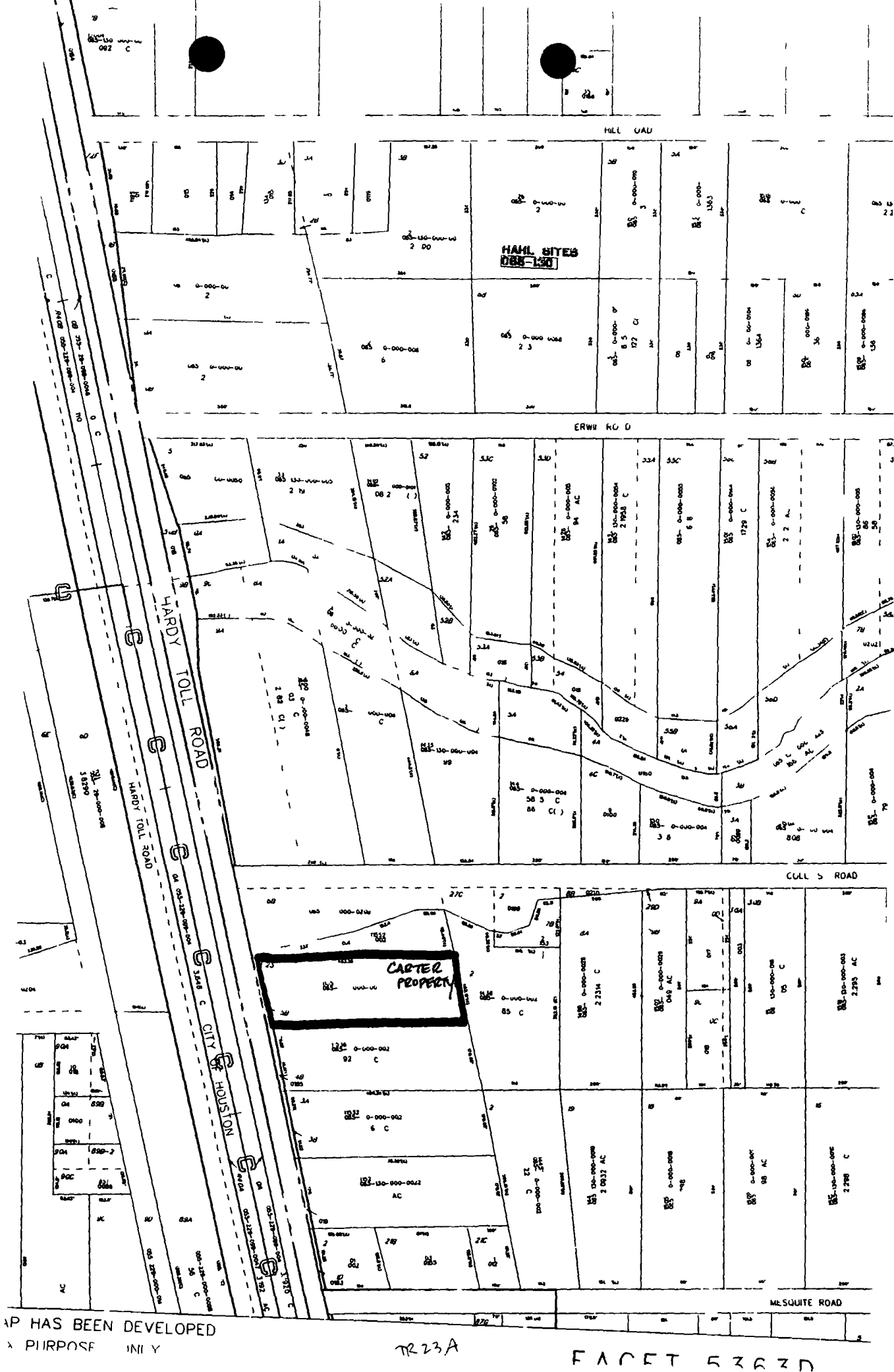
IT IS SO ORDERED

BY _____

DATE _____

Allyn M Davis Director
Hazardous Waste Management Division (6H)


EFFECTIVE DATE _____



REFERENCE 4

FEB 6 1992

3x1988041446

 EPA		POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION		VI / FEB 3 5 1 1	
NOTE: The identification of a potential site should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.					
SITE NAME Card Blanc / Carter		SITE ADDRESS 11548 & 11532 E Hardy Rd			
CITY Houston		STATE TX		ZIP CODE 77093	
COUNTY Harris					
G. O. EMPLOYED TO (known) L. NAME Estelle Carter (owner) / RAY DOVE (operator) (713) 465 5239					
H. TYPE OF OPERATIONS (known) <input type="checkbox"/> 1. FEDERAL <input type="checkbox"/> 2. STATE <input type="checkbox"/> 3. COUNTY <input type="checkbox"/> 4. C/P <input checked="" type="checkbox"/> 5. TE 7. L. (713) 442 8493					
SITE DESC ID Approx 116 55 gal & 85-gal steel drums, 7000 5-gal poly containers >30 35-gal Fiber board Drums & 3 pallets of sacked material exist (apparently abandoned) on an active facility (Card Blanc Sucs) and on private property. Site is located in a residential/commercial area in the northern portion of Houston, Harris Co, TX.					
DE OPERATOR NOTIFIED TWC, TWC notified EPA 2/91					
L. SUMMARY Containers located on site contain a variety of listed hazardous substances & characteristic hazardous wastes. The containers have been apparently abandoned at the site since 5/88. The containers are in a state of severe deterioration and continue to do so. General access is restricted by the facility fence; however, workers have potential for direct exposure. Nearest resident is ~300 ft NE of source and utilizes wells for drinking water. Release of hazardous substances to the environment continues and the potential for public contact remains.					
M. NAME E. NAME GARCIA W GUEZRA OSC 214 655 2275 05 FEB 92					

REFERENCE 5

7171600 - 0



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

44

12 January 1993

URGENT LEGAL MATTER PROMPT REPLY NECESSARY

CERTIFIED MAIL/RETURN RECEIPT REQUESTED

P 110 204 268

EPA ID NO TXD988061446

**Mr Ray Dove
Card Blanc Carter
11532 E Hardy Road
Houston TX 77093**

**RE. EPA Preliminary Assessment
Site Access Request**

Dear Mr Dove

The purpose of this letter is to request you to voluntarily permit the U S Environmental Protection Agency (EPA) and parties authorized by EPA, including but not limited to Roy OF Weston, Inc., (WESTON®) (Contract No 68-W9-0015) access to Card Blanc Carter (located at 11532 and 11548 E Hardy Road, Houston, Texas 77093) so that EPA can enforce the provisions of the Resource Conservation and Recovery Act (RCRA) as amended 42 USC, Sections 6901 6992k, and, pursuant to Section 104(e) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) as amended copy pertinent documents or records inspect the site and obtain samples of any suspected hazardous substance or pollutant or contaminant found on site

Specifically WESTON has been requested by the EPA, Region 6 to conduct a Preliminary Assessment (PA) of the above named site to assess the degree of risk to the public health, welfare and environment related to hazardous substances, pollutants or contaminants that may be present at the site Based on file information EPA finds it necessary to perform this PA pursuant to 40 CFR 300 400 Subpart E

Section 3007 of RCRA, 42 U S C Section 6927 authorizes EPA to require information relating to hazardous waste from any person who generates stores treats transports, disposes of or otherwise handles or has handled hazardous wastes Section 104(e) of CERCLA, 42 U S C Section 9604(e) authorizes EPA to require any person who has or may have information relating to any of the following to furnish information or documents relating to

URGENT LEGAL MATTER PROMPT REPLY NECESSARY

Mr Ray Dove

12 January 1993

Page 2

- 1 The identification nature and quantity of materials which have been or are generated, treated stored, or disposed of at a vessel or facility or transported to a vessel or facility**
- 2 The nature or extent of a release of a hazardous substance or pollutant, or contaminant at or from a vessel or facility**
- 3 Information relating to the ability of a person to pay for or perform a cleanup**

Section 104(e) of CERCLA also explicitly grants EPA the authority to enter a property for determining the need for response or choosing or taking any response action under this title or otherwise enforcing the provision of this title

If consent is not granted regarding a request made by EPA under Section 104(e) of CERCLA, the EPA may issue an administrative order directing compliance with such request, or apply for an administrative inspection warrant. The EPA may also ask the Attorney General to commence a civil action to compel compliance with a request made by EPA under Section 104(e). The court may assess a civil penalty not to exceed \$25 000 for each day of noncompliance against any person who fails to comply with the provisions of Section 104(e) or with an order issued thereunder

However it is EPA policy to seek voluntary cooperation from the public when possible. Consequently EPA is making this request for access to the property and records described above. EPA hopes that you will voluntarily comply by signing, dating and returning the enclosed Consent for Access to Property to the address indicated below within seven days of your receipt of this letter. Please mail to

**Stacey Bennett (6E SH)
Hazardous Waste Section
USEPA Region 6
1445 Ross Avenue Suite 1200
Dallas TX 75202 2733**

If EPA has not received the enclosed consent for access to the property within seven days of receipt of the letter signed and dated by you, EPA will treat your failure to respond as a denial of access. Also please note that EPA will not agree to conditions which will restrict or impede the manner or extent of an inspection or response action impose indemnity or compensatory obligations on EPA, or operate as a release of liability. Should you impose conditions of this nature in the consent for access to the property EPA will treat this as a denial of consent

URGENT LEGAL MATTER PROMPT REPLY NECESSARY

Mr Ray Dove
12 January 1993
Page 3

You may assert a business confidentiality claim covering part of the information you submit in response to this request. Any such claim must be made by placing on (or attaching to) the information, at the time it is submitted to EPA, a cover sheet or a stamped or typed legend or other suitable form of notice employing language such as trade secret 'proprietary' or company confidential. Confidential portions of otherwise nonconfidential documents should be clearly identified and may be submitted separately to facilitate identification and handling by EPA. If you make such claim the information covered by that claim will be disclosed by EPA only to the extent, and by the means of the procedures set forth in Subpart B of 40 CFR Part 2. If no such claim accompanies the information when it is received by EPA, it may be made available to the public without further notice to you. The requirements of 40 CFR Part 2 regarding business confidentiality claims were published in the Federal Register on September 1, 1976 and amended on September 8, 1978, and December 18, 1985.

As part of the information gathering process the collection of samples from your site may become necessary. This collection process may generate investigational derived wastes (IDWs) such as equipment rinse water or disposable personal protective clothing. WESTON will manage these IDWs in the most responsible manner consistent with EPA guidance regarding these wastes.

Field inspection and sampling activities at the site will be scheduled upon EPA receipt of the signed consent for access form, and WESTON will contact you to verify the exact dates of these visits. During the visit you will be provided with a receipt describing any samples obtained and, if you so request, you will be given a portion of each sample. There will be no charge for the samples EPA provides you. If you would like a portion of each sample please put a check mark in the space provided in the enclosed consent for access to property. If you do not wish to be provided with a portion of each sample please put a check mark in the alternative space. If you do not mark any space EPA will treat your failure to respond as your statement that you do not wish to be provided with a portion of each sample.

A copy of the resulting inspection report and analytical data can be obtained by writing to Ed Sierra, Chief, Superfund Site Assessment Section (6H MA) EPA Region 6 1445 Ross Avenue Suite 1200 Dallas TX 75202 2733

URGENT LEGAL MATTER PROMPT REPLY NECESSARY

Mr Ray Dove
12 January 1993
Page 4

In future inquiries please indicate your site's EPA ID Number at the top of all correspondence to ensure prompt processing. If you have any questions concerning this matter please contact me at (214) 655-6491

Sincerely

Stacey Bennett
Work Assignment Manager
Hazardous Waste Section

SB/cfl

cc Stennie Meadors
Pollution Cleanup Division
Texas Water Commission
P O Box 13087 Capitol Station
Austin, Texas 78711

URGENT LEGAL MATTER PROMPT REPLY NECESSARY

Mr Ray Dove
12 January 1993
Page 4

In future inquiries please indicate your site's EPA ID Number at the top of all correspondence to ensure prompt processing. If you have any questions concerning this matter please contact me at (214) 655-6491

Sincerely

Stacey Bennett
Work Assignment Manager
Hazardous Waste Section

SB/cfl

cc Stennie Meadors
Pollution Cleanup Division
Texas Water Commission
P O Box 13087 Capitol Station
Austin Texas 78711

bcc B Williamson (6H M)
R Meacham (6X)
V McFarland (6H M)
P Charles (6X)
B Goetz (6XOCL)

CONSENT FOR ACCESS TO PROPERTY

Name Mr Ray Dove

EPA LD No TXD988061446

Description of Property Card Blanc Carter
11548 and 11532 E. Hardy Rd.
Houston, Texas 77093

I hereby consent to Roy F Weston, Inc., duly authorized consultant of the United States Environmental Protection Agency (EPA) entering and having continued access to the property described above for the following purposes

- 1 Reviewing and copying documents related to the site,
- 2 The collection of soil, water air samples
- 3 The sampling of any solids or liquids stored or disposed on the property
- 4 The drilling of holes and installation of monitoring wells for subsurface investigations
- 5 Other actions related to the investigation of surface and subsurface contamination

I realize that these actions are undertaken pursuant to the EPA's response and enforcement responsibilities under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) 42 USC Section 9601 9626 and the Resource Conservation and Recovery Act (RCRA) 42 USC Section 6297

I am the property owner or a responsible official of the property owner and I warrant that I have the authority to make this access agreement.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any kind

2/15/93
Date

Roy F. Weston, Inc.
Signature

Place a check mark in the appropriate space Please note that if no space is marked, the EPA will treat your failure to mark a space as your statement that you do not wish to be provided with a portion of each sample

☒ Please provide me a portion of each sample taken at the property described above

☐ I do not wish to be provided with a portion of each sample taken at the property described above.

REFERENCE 6

T144600029

Jeff S Wormser

ORIGINATOR

W E S T O N
PHONE CONVERSATION RECORD

CONVERSATION WITH	DATE 12 May 1993
NAME Stacey Bennett	TIME 2 00 pm
COMPANY US EPA	X ORIGINATOR PLACED CALL
ADDRESS 1445 Ross Avenue Suite 1200 Dallas Texas	ORIGINATOR RECEIVED CALL
PHONE (214) 655 8374	W O N O 04603 022 034 2400
SUBJECT Card Blanc/Carter Site (TXD988061446)	

NOTES Mr Jeff Wormser with Mr Robert Beck contacted Mrs Bennett to inform her of the following findings concerning the Card Blanc/Carter Site

During the week of 9 May 1993 Mr Wormser attempted to contact Mr Raymond Dove to arrange a time for the site reconnaissance His phone number was not in service at the time of the call Mr Wormser proceeded to contact Southwestern Bell and they indicated that the phone number for the Card Blanc/Carter Site was disconnected

Mr Wormser proceeded to perform a drive by survey of the site At the reported address of the site a sign on the fence indicated a different name and phone number for the site and it is as follows

R D Dove Co Inc
Equipment Parts and Rental
11532 E Hardy
Houston Texas 77093
(713) 442 849X0

Both properties at 11532 and 11548 East Hardy Road were vacant during the drive by survey with the exception of a rental car parked in front of the office trailer at R D Dove Co Inc

WESTON informed Mrs Bennett that Mr Wormser had spoken to Mrs Estelle Carter owner of the Carter property which is adjacent to the property describe above WESTON arranged to

meet Mrs Carter at the site to interview her

Mrs Bennett proceeded to authorize an offsite reconnaissance for the site based on these recent findings and the fact that Mr Dove could not be contacted (Mr Dove is the one who had signed the access letter)

FILE 17 24

COPY/ROUTE TO JSW

\nf rm\2400c m12

REFERENCE 7

T/4 1 2

21

CARD BLANC/CASPER

CERCLA I.D. No.

TXD988061446

Houston, Tx.

DCN: 4603-22-0088

NATIONAL

20

DUPLICATING TRANSIT
BOOK

1

5/20/93

JEFF S. WORMSER

1000 JEFF S. WORMSER AND ROBERT J. CLUMPS (JSH & RSH) Arrived at site Conducted Health and Safety meeting and discussed site activities

1010 Met Estelle Carter and her husband Gene Carter at their property which is located adjacent to site to the north. They stated that Ray Doe, owner of Carl Blum/Carter, has owned the site property for 20 to 30 years. They stated that he was involved in heavy equipment sales and rental. In addition, they stated that he enriched on their property by storing equipment and erecting a fence on the Carter's property. Mrs. Carter stated that several years ago, a fire occurred in the southern section of the Carl Blum/Carter site and that a small vapor tank and TV regulators came to the site. She stated she does not remember who came on response

1

5/20/93

JEFF S. WORMSER

- to the fire. She stated for JSH to call her at home, and she could provide the name and phone number for a person she gave a deposition to concerning the fire. She stated that Ray Doe blamed Mrs. Carter for starting the fire.
- 1045 JSH/RSH went back to site. Located car in a gravel area between the fence that encompasses the Carl Blum site and the frontage road for the Hardy Hill Road. The site is located at 11548 and 11532 according to identification form.
- Western is only going to perform an optical reconnaissance of the site.
- A fence with barbed wire encompasses the entire site. The site includes a mobile home trailer, a wooden office building, a 11760 lb diesel pump. The shop has garage doors large enough for 18 wheelers.

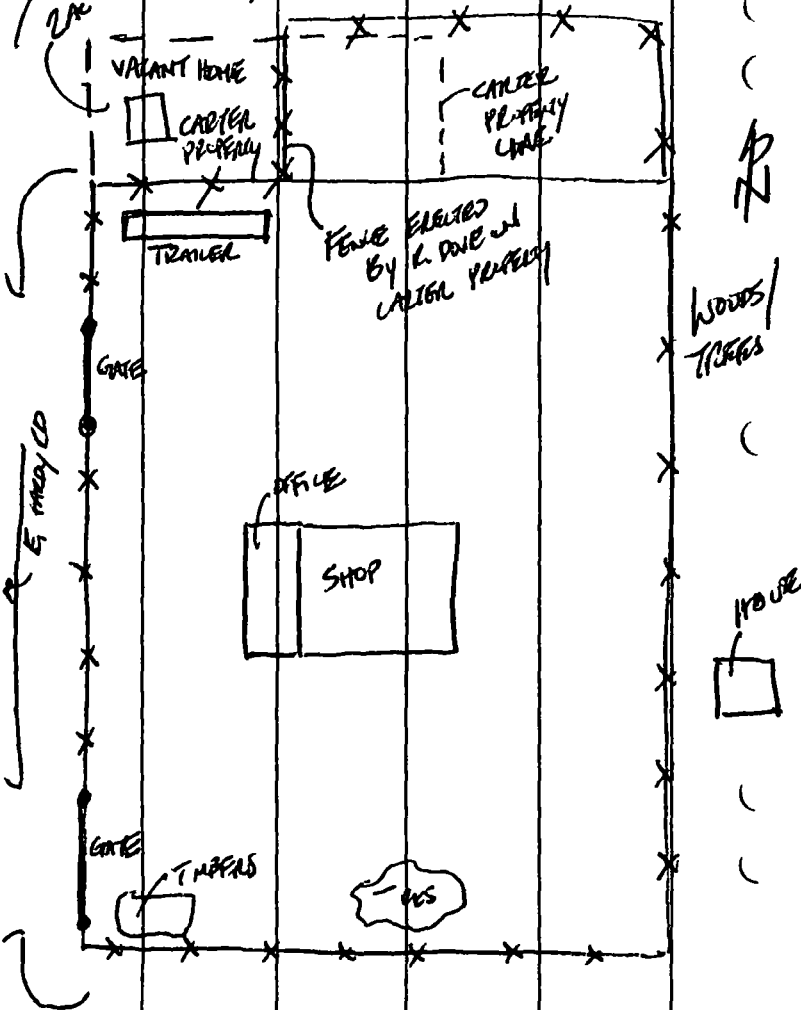
Jeff S. Wormser
5/20/93

2

5/20/43

JACK S. KRAMER

Then all original camp pits located
 inside along with pits, trees,
 bricks, and excavated tanks



5/20/43

JACK KRAMER

2

A fence encompasses the entire site
 However, it is not clear how far
 Does property end on it therefore, he
 might have erected fences on
 other property like he
 did on the Coker's The other
 most northern fence is along
 Collins Rd Trees and heavy
 vegetation bound the site to the
 east and south E Hardy Road
 bounds the site to the west.
 The Coker property bounds the
 site to the north

1140

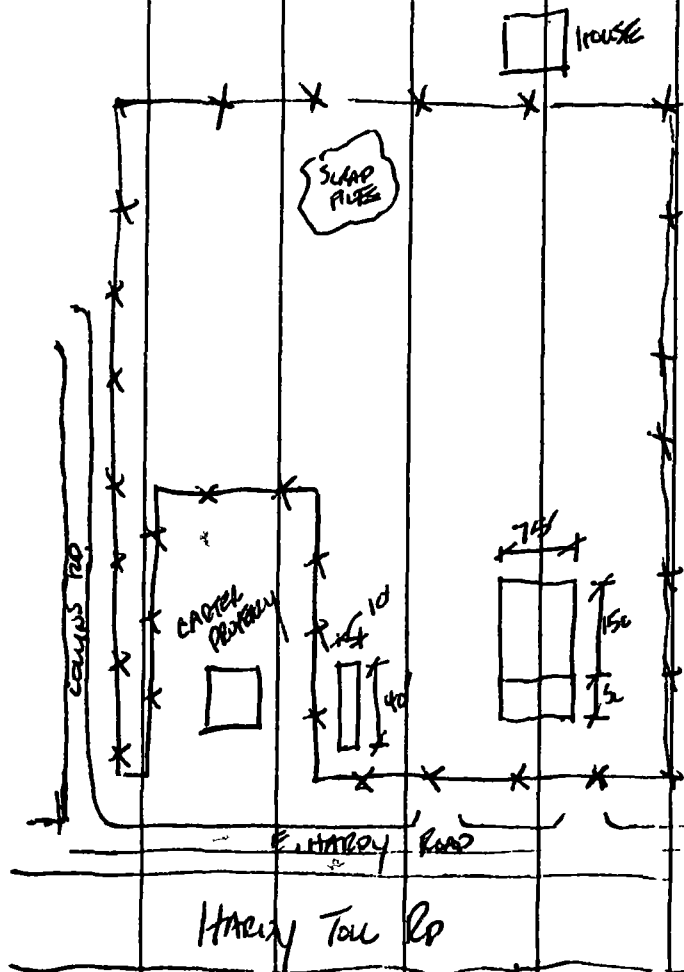
Took photographs
 identified a house on property
 adjacent to the east
 side of the property identified
 location of all pits See page 3

Jack S. Kramer
 5/20/43

3

5/20/93

Jeff Wagoner



Dimensions shown are only estimated
 based on visual observations
 1200 Left Side

3

REFERENCE 8

T144600031

SITE RECONNAISSANCE CHECKLIST GENERAL SITE INFORMATION WORKSHEET

I. SITE INSPECTION INFORMATION

1. ☒ Date and time of the inspection: 5/20/93 at 10:00 a.m.
2. ☒ WESTON personnel performing the inspection:
 - a. JEFF S. WORSER
 - b. ROBERT J. ULMER
 - c. _____
3. ☒ Names of site owner or representatives present
 - a. ESTELLE CARTER
 - b. _____
 - c. _____
4. _____ Names of regulatory officials present:
 - a. _____
 - b. _____
 - c. _____
5. ☒ Weather conditions during inspection:
 - a. Temperature: 80 degrees F
 - b. Cloud Cover: 02 percent
 - c. Rain/snow: 02 amount

II. GENERAL SITE INFORMATION

1. ☒ Official site name / CERCLIS ID: CARD BLANC/CARTER (TXD 9802-1446)
2. _____ Accurate street address: 11549 AND 11532 E. HWAY RD
3. ☒ City and State: HOUSTON, TX
4. ☒ List current owner(s) name(s) and address(es):
RAYMOND D. DONE
ESTELLE CARTER
5. _____ List past site owners and addressess, if possible:
5. ☒ Indicate ownership type ("C" for current, "P" for past)

a. <input checked="" type="checkbox"/> Private	e. _____ Federal
b. _____ Municipal	f. _____ DOD
c. _____ County	g. _____ DOE
d. _____ State	h. _____ Indian
e. _____ Unknown	i. _____ Other (describe): _____

B. _____ Verify site location on a topo map, indicating the reason for any discrepancies below:

SITE RECONNAISSANCE CHECKLIST SITE FEATURES WORKSHEET

III. SITE FEATURES

1 Draw a sketch map of the site to show the location of important site features

2 ✓ Describe site access features

- a. Locations where the site can be accessed
- b. Major roads leading to site
- c. On site roads / paths and their condition
- d. Location/condition of barricades impeding site access

OFF OF HARDY TOLL RD, EAST

HARDY TOLL RD

① FEEDER/FRONTAGE ROAD

3 ✓ List current/historic site occupants and landuse

- a. VACANT
- b. RD POVE COMPANY, INC
- c.
- d.

4 Indicate the nature of the site occupant(s) (put corresponding letter from above beside type below)

- | | |
|--|--|
| a <u> </u> Lumber or wood products | l <u> </u> Retail |
| b <u> </u> Inorganic chemicals | m. <u> </u> Recycling |
| c <u> </u> Plastics or rubber products | n. <u> </u> Junk/salvage yard |
| d <u> </u> Paints or varnishes | o <u> </u> Municipal landfill |
| e <u> </u> Industrial organic chemicals | p <u> </u> DOD |
| f <u> </u> Agricultural chemicals | q <u> </u> DOE |
| g <u> </u> Misc. chemical products | r <u> </u> DOI |
| h <u> </u> Fabricated structural metal products | s <u> </u> Other federal facility <u> </u> |
| i <u> </u> Electronic equipment | t <u> </u> RCRA TSD site <u> </u> |
| j <u> </u> Other manufacturing <u> </u> | u <u> </u> RCRA generator <u> </u> |
| k <u> </u> Mining and other exploration <u> </u> | v <u> </u> Other RCRA <u> </u> |
| | x <u> </u> Other <u> </u> |

5 ✓ Status a. Active b. ✓ Inactive or left site

6 ✓ Describe buildings or other structures (occupant, size location use)

- a. MOBILE HOME TRAILER / OFFICE
- b. OFFICE BUILDING - WOODEN BUILDING
- c. MAINTENANCE SHOP METAL BUILDING, LARGE GARAGE DOORS (BAY ENOUGH FOR TRUCKS)
- d.
- e.

7 Locate and describe the following

- a. Municipal water supply hook ups, if any
- b. Storm drain Inlets or discharge points
- c. Sanitary sewers
- d. ✓ Parking lots and other impervious surfaces
- e. Water wells
- f. Oil and gas wells
- g. Mining activities onsite
- h. Rail spur locations (usage)
- i. Pipelines (owner/contents)
- j. Other easements

GRAVEL, FROM FRONTAGE RD EXTENDING

② BACK INTO PARKING

SITE RECONNAISSANCE CHECKLIST
SITE FEATURES WORKSHEET CONTINUED

IV NATURAL SITE FEATURES

- 1 ☐ Describe regional and site topography _____
- 2 ☐ Determine the site surface gradient / slope _____
- 3 ☐ Describe site and adjacent property vegetation _____
- 4 ☐ Describe site surface soils (texture, color structure) _____

- 5 ☐ Describe site and local surface geological features (lithology structures, grain size)

- 6 ☐ Locate and map nearby surface water bodies surface
 - a. Determine the dimensions and profile of each surface water body

 - b Describe flow rate and direction of flow if any

 - c Indicate the type surface water usage (fisheries water intakes)

- 7 ☐ Locate and map any springs, seeps ponded areas or wetlands
- 8 ☐ Locate and map any drainage swales or ditches onsite
- 9 ☐ Determine the direction and destination of site runoff _____
- 10 ☐ List other potentially sensitive environments
 - a _____
 - b _____
 - c. _____

V OTHER NOTABLE SITE FEATURES

- 1 ☒ Describe any other notable site features below

GENERAL SCRAP PILES

CREOSOTE TIMBERS

TREES

BELLS

VI. SITE OPERATIONAL HISTORY

- 1 ____ Describe the exact types and quantities of wastes stored and generated (what/when)
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____
- 2 ____ Determine the locations of historic waste disposal practices onsite (check as source area below)
- 3 ____ Map and describe historic buildings, storage areas or process areas no longer obvious onsite
- 4 ____ Determine the current/historical number of occupants or workers onsite daily _____
- 5 ____ Describe in detail the current/historical processes used onsite
- 6 ____ List site environmental related permits (RCRA, TACB TWC, TRRC, TDH, etc.)
 - a. _____
 - b. _____
 - c. _____
 - d. _____
- 7 ____ Get copies of any manifests or other records available
- 8 Describe other relevant facts concerning site operations

THE SITE IS VACANT / ABANDONED

**SITE RECONNAISSANCE CHECKLIST
POTENTIAL WASTE SOURCES IDENTIFICATION WORKSHEET**

A. Check the potential waste sources below which are found onsite

- 1 ☐ Dry wells or injection wells
- 2 ☐ Ponds, lagoons or other surface impoundment
- 3 ☐ Landfills
- 4 ☐ Land treatment or land farming areas
- 5 ☐ Areas of contaminated soil
- 6 ☐ Storage tanks or other nondrum containers
- 7 ☐ Drums or drum like containers
- 8 ☐ Incineration areas or burn pits
- 9 ☐ Piles (Chemical, scrap metals, tailings, etc.)
- 10 ☐ Ventilation systems
- 11 ☐ Hydraulic lifts
- 12 ☐ Pits or sumps
- 13 ☐ Transformers
- 14 ☐ Contaminated sediments or surface water with unidentified source
- 15 ☐ Contaminated groundwater with unidentified source
- 16 ☐ Other source type (describe _____)
- 17 ☐ No sources identified

SITE RECONNAISSANCE CHECKLIST WASTE SOURCE DESCRIPTION WORKSHEET

(Complete one sheet for each source area)

- 1 ☐ Assign waste source a name for identification _____
- 2 ☐ Status of source area (closed, inactive, active) _____
- 3 ☐ Locate the source area on a map and describe location. _____
- 4 ☐ Measure the dimensions of the source area. _____
- 5 ☐ Determine the length of time that the source area contained waste _____
- 6 ☐ Describe the method of source containment and degree of maintenance _____
- 7 ☐ Describe the method of secondary containment and maintenance. _____
- 8 ☐ Indicate the current and historical contents of source area.

a. <input type="checkbox"/> Metals	i. <input type="checkbox"/> Paints/pigments/dyes
b. <input type="checkbox"/> Inorganics	j. <input type="checkbox"/> Solvents
c. <input type="checkbox"/> Organics	k. <input type="checkbox"/> Laboratory/hospital waste
d. <input type="checkbox"/> Radioactive waste	l. <input type="checkbox"/> Construction/demolition waste
e. <input type="checkbox"/> Pesticides/herbicides	m. <input type="checkbox"/> Acids/bases
f. <input type="checkbox"/> Oily waste	n. <input type="checkbox"/> Municipal/residential type waste
g. <input type="checkbox"/> Mining waste	o. <input type="checkbox"/> Other (describe) _____
h. <input type="checkbox"/> Explosives	
- 9 ☐ Describe the physical state of the waste (check one)

a. <input type="checkbox"/> Solid	b. <input type="checkbox"/> Powder
c. <input type="checkbox"/> Liquid	d. <input type="checkbox"/> Sludge
e. <input type="checkbox"/> Gas	
- 10 ☐ Determine the location of waste generation

a. <input type="checkbox"/> onsite	b. <input type="checkbox"/> offsite (generator)
------------------------------------	---
- 11 ☐ Indicate who authorized waste deposition

a. <input type="checkbox"/> Present owner	c. <input type="checkbox"/> Unauthorized
b. <input type="checkbox"/> Former owner	d. <input type="checkbox"/> Unknown
- 12 ☐ Assess the accessibility of the source area to the public

a. <input type="checkbox"/> Accessible	b. <input type="checkbox"/> Nonaccessible (why) _____
--	---
- 13 ☐ Current and historical high level of containment _____
- 14 ☐ Method of secondary containment and degree of maintenance _____
- 15 ☐ Indicate if there is visual evidence of a release

a. <input type="checkbox"/> Discharges or waste streams (Indicate receiving body) _____	
b. <input type="checkbox"/> Leachate outbreak	
c. <input type="checkbox"/> Spill or leak	
d. <input type="checkbox"/> Other type of release (describe) _____	
- 16 ☐ Indicate if there is visual evidence of contamination around source

a. <input type="checkbox"/> Stained/contaminated soil (area) _____	
b. <input type="checkbox"/> No evidence of	
- 17 ☐ Describe cover over the source area

a. <input type="checkbox"/> Engineered cap	
b. <input type="checkbox"/> Buried (w/soil, asphalt, etc.)	
c. <input type="checkbox"/> Other (Roof, tarp etc.)	
- 18 ☐ Functioning collection or venting system (describe in detail) _____
- 19 ☐ Evidence of biogas release (odors, vapors, FID response) _____
- 20 ☐ Describe Vegetation around source area

a. Type and degree of vegetation _____	
b. Condition of vegetation (stressed/unaffected) _____	

VIII. OFFSITE SURVEY

1 ☒ Describe and locate on map adjacent and nearby sites of interest:

- a. PROPERTY TO NORTH IS OWNED BY ESTELLE CARRER. IT IN LIES AN ABANDONED HOME WITH SIGNS OF IT BEING USED FOR SATANIC RITUALS
b. _____
c. _____

2 _____ Map location of public facilities (schools, day care facilities, parks, etc.)

- a. _____
b. _____
c. _____

3 _____ Determine the location and number of residences within a 1/2 mile radius of the site

4 _____ Determine the population of workers, schoolchildren, etc in areas near the site

5 _____ List alternative source sites within a four mile radius

a. Automobile service stations

1. _____
2. _____

b Dry cleaners

1. _____
2. _____

c Manufacturing/industrial sites

1. _____
2. _____

d. Rail loading areas

1. _____

e Landfills

1. _____

f Other sites

1. _____

6 _____ Locate and describe surface water bodies as follows

- a. Distance to probable point of entry of a waste from the site
b Flow rate and direction of flow
c. Storm drains discharging into the surface water body
d. Potential targets along the surface water
e Branching in surface water flow path and effect on target
f. Tidal influence effect on flow
g Tributaries with alternative source sites
h. Drinking water intakes
i. Fishing or other recreational use recreation

7 _____ Locate and describe water wells in the distance limit, as possible

- a. Location of well and distance from site
b Well owner and population potentially served
c. Well usage and completion information

REFERENCE 9

T 4156 1-2

File

FU

Texas Water Commission

INTEROFFICE MEMORANDUM

TO Ernest Heyer Chief Field Support Section DATE 10-31-91
Field Operations Division

THRU *SWB*
Susan Bredehoeft Program Manager of H&SW
District 7 - Houston Office

FROM Robert Musick Field Investigator

SUBJECT District 7 - Houston

Request for State Funded Cleanup 11548 East Hardy
Houston Texas 77093

On March 11 1991 Mr Robert Musick of the TWC District 7 Field Office received a request from Patrick Pendleton of Harris County Pollution Control to assist in a complaint investigation located at 11548 East Hardy Road Houston Texas (See Attachment 1) The location of the complaint is at the southeast intersection of East Hardy Road and Collins Street *key MAP 413L*

The Harris County Appraisers District (HCAP) indicates the property is listed as Tract 25A of the Hahl Sites Survey and consists of 1 9355 acres According to tax records at the HCAD the present owner of the property is Estelle Carter (9836 Westview Drive Houston Texas Telephone (713) 465-5239) who recently inherited the property with approximately 250 barrels of abandoned drums from her brother Mr Delbert Riley (deceased) (See Attachment 3)

Field Inspection

On March 14 1991 Mr Robert Musick of the District 7 Field Office inspected the site at the request of Harris County Pollution Control The property is fenced and secure from entry from all sides except from the 11532 East Hardy property owned by Card Blanc Services The only entrance to the abandoned drums located at 11548 East Hardy Road is through an adjacent property owned by Card Blanc Services of America Incorporated located at 11532 East Hardy Houston Texas The property boundary between these two addresses is not well marked by any noticeable or traditional boundary markings The owner of Card Blanc Services is Mr Ray Love

Photographs 1 through 7) It was noted that many of the paper fiber drums most of the 50 pound bags on pallets and many of the metal 55 gallon drums had deteriorated and were leaking (See Photographs 1 through 7) Some of the drums were not closed and rain water has displaced the unknown material resulting in discharges onto the ground (See Photographs 4 5 6 and 7) Discolored soil dead vegetation and stressed vegetation was observed at that abandoned drum location A distinct chemical odor was also detected at the site

Case History

During the course of the investigation it was determined that these drums had been the focus of a TWC investigation conducted by Ms Linda Kuhn of the TWC Field Office in February and May 1988 (See Attachment 2) The history of the drums has been divided into two (2) main discussions Pre-abandonment (Ms Linda Kuhn s Investigation) and Post-abandonment (Robert Musick s Investigation)

a Pre-abandonment

On February 1 1988 a field investigation was conducted by Ms Linda Kuhn of the TWC District 7 Field Office at Mann Warehouse at 1120 Lockwood Drive Houston Texas (See Attachment 2) The investigation was requested by Zafar Iqbal of the City of Houston Environmental Department The February 1 1988 investigation resulted in Ms Linda Kuhn documenting the improperly stored drums at the Mann Warehouse and issuing a notice of violation (NOV) letter dated February 5 1988 to dispose of the drums in a proper manner and remediate any contaminated soils This letter was sent to Gene Mann of Mann Warehouse Mr Mann responded to the NOV by stating that he did not own the drums but merely provided rental space for the owners of the drums He also stated that he had previously requested that the drums be removed He provided Ms Kuhn with the names of the owners of the drums but stated he did not have a mailing address for them

Mr Mann also described the history and the origin of the drums from his perspective In 1987 Lockwood National Bank of Houston took possession of the salvage materials in Mann Warehouse to foreclose on a \$1 200 000 00 debt The salvaged materials and chemicals were sold in a public sale as required by a court order that the bank obtained (Cause no 88-22192) from Judge Louis Moore 281st Civil District Court

On October 23 1987 the salvage drums were sold in a public sale at a public auction sponsored by Lockwood National Bank of Houston. A salvage inventory was conducted pursuant to the sale of the material (See Attachment 2). The salvage material was purchased by three persons: Mr. Craig McLerran, Mr. Charles Pete Miller and Mr. Jesse Jackson representing Page Turbines Incorporated, Houston, Texas (See Attachment 3). The salvage material was required by the terms of the sale to be removed from Mann Warehouse property by November 10 1987. Since the drums were not removed by November 10 1987, a new agreement was reached in which the three new owners of the drums had until December 30 1987 to remove the salvage material. The drums were not removed from the premises by December 30 1987, so a new rental agreement between Mann Warehouse and the three new owners of the salvaged material gave the new owners monthly rental of Mann Warehouse property. This rental of Mann Warehouse continued until removal of the salvaged drums from the Mann Warehouse facility on May 5 1988.

On May 5 1988, Ms. Linda Kuhn of the TWC District 7 Field Office received a telephone call from Mr. Gene Mann, owner of Mann Warehouse, indicating that the drums were being loaded on trucks for removal from Mann Warehouse property. Mr. Mann indicated to Ms. Linda Kuhn that the new owners of the salvage material may not be properly managing the salvage material (See Attachment 2). Ms. Linda Kuhn responded to Mr. Mann's telephone call by conducting a second field inspection the same day (May 5 1988). During the inspection, the new owners of the salvage material (Page Turbine Incorporated) strongly contended that the drums and chemicals were salvage material and not waste. The owners of the drums stated that they had sold the salvage materials to a Mexican company. They indicated to the TWC inspector that the material was to be sold to Provcedoro Del Bravo of Matamoros, Mexico.

b Post-abandonment

On March 14 and October 10 1991, a TWC complaint investigation was conducted at the abandoned drum site located at 11548 East Hardy Road at the request of Harris County Pollution Control. The TWC investigation included a field inspection of the facility (See Photographs), a meeting with Ray Dove of Card Blanc Services located at 11532 East Hardy Road (adjacent to the abandoned site), numerous phone calls to HCPC, HCAD, City of Houston, and discussions with Ms. Linda Kuhn (initial investigator).

File
Page -4-
October 31 1991

Mr Ray Dove s interpretation of the event indicated that the salvage material was brought to the 11548 East Hardy Road location from Mann Warehouse Mr Dove stated that he initially found out about the salvage material and was interested in purchasing the material at the Mann Warehouse facility but failed to submit a bid for purchasing the salvage material because much of the material was not in good condition and was not consistent with Card Blanc s equipment salvage business

Mr Dove stated that a gentlemen named Mr James Moore (last known address was in Hubbard Ohio) representing Coastal Salvage Company located at 17403 Guinn Road Houston Texas was acting as an agent to sell the salvage materials for the owners (Page Turbine Incorporated) of the material (See Attachment 3) Mr Moore indicated that a court order required removal of the salvage material from Mann Warehouse

Mr Ray Dove of Card Blanc introduced Mr Delbert Riley (the original owner of 11548 East Hardy Road) to Mr James Moore An arrangement was made between Mr Delbert Riley and Mr James Moore (sales agent) which allowed Mr Moore to use Mr Riley s property as a temporary staging area because of time constraints caused by the court order According to Mr Dove the use of Delbert Riley s property was suppose to be for one or two days

The salvage material was to be transferred from the Mann Warehouse facility to the undeveloped land at 11548 East Hardy Road to be sorted and repackaged to be shipped to Mexico This would give Mr Moore enough time to separate and ship the material to the appropriate destination(s) According to Mr Dove permission was granted to Mr James Moore for temporary storage on Delbert Riley s property

Once an arrangement had been obtained between Mr Riley and Mr Moore the savage material was loaded on trucks on May 5 1988 (witnessed by Ms Linda Kuhn of the TWC Field Office and outlined in Attachment 2) The transporter was Malvo s Trucking (713-673-6529) Mr Malvo trucked approximately 15 full truck loads to the new location (11548 E Hardy Road Houston Texas) The trucks entered Card Blanc property to obtain access to Mr Riley s property Mr Malvo indicated that he never was paid for the transport of the salvage material to the new location at 11548 East Hardy Road Houston Texas

In discussion with Mr Ray Dove it was noted that the material brought to the site was in poor condition Some of

the salvage material which was in better condition at the Mann Warehouse may have been brought to other locations to be sold or put into storage After the salvage material (abandoned drums) was taken to Mr Delbert Riley s property Mr James Moore failed to return to the site to further dispose of the unused salvage material

Field Office Request

Based on the following information the District 7 office requests that the screening committee review the information presented and make a determination on the best pathway to clean-up the site (i e Emergency Response Superfund) and to determine if any criminal investigation is needed It should be noted that

- 1 The elderly landowner (Estelle Carter) does not have adequate funds to dispose of the wastes and to properly remediate the site It should also be noted that the landowner had no involvement in the business transaction agreed to by her brother
- 2 The site is a potential health hazard since Card Blanc offices are approximately 200 feet from the drums Chemical odors are migrating off-site onto Card Blanc property and also into the adjacent neighborhoods which are approximately 500 feet from the abandoned drums
- 3 The salvage drums have resulted in observable soil discoloration stressed and dead vegetation at the site because of numerous leaks observed at the site (See Photographs)
- 4 The abandoned drums are a threat to the waters of the state because of rain run-off and potential groundwater contamination
- 5 The drums appear to have been intentionally dumped onto the site for the purpose of abandonment and
- 6 Several of the potential responsible parties (PRP s) could not be located or contacted to further the investigation (See Attachment 3)


Based on the information provided and the serious nature of an impact to the environment it is requested that prompt action be taken to resolve this environmental incident

File
Page -6-
October 31 1991

Signed


Robert Musick
Field Investigator

Approved


Susan D Bredehoeft
Program Manager
Hazardous and Solid Waste Program
District 7 - Houston

SDB/RM/tl

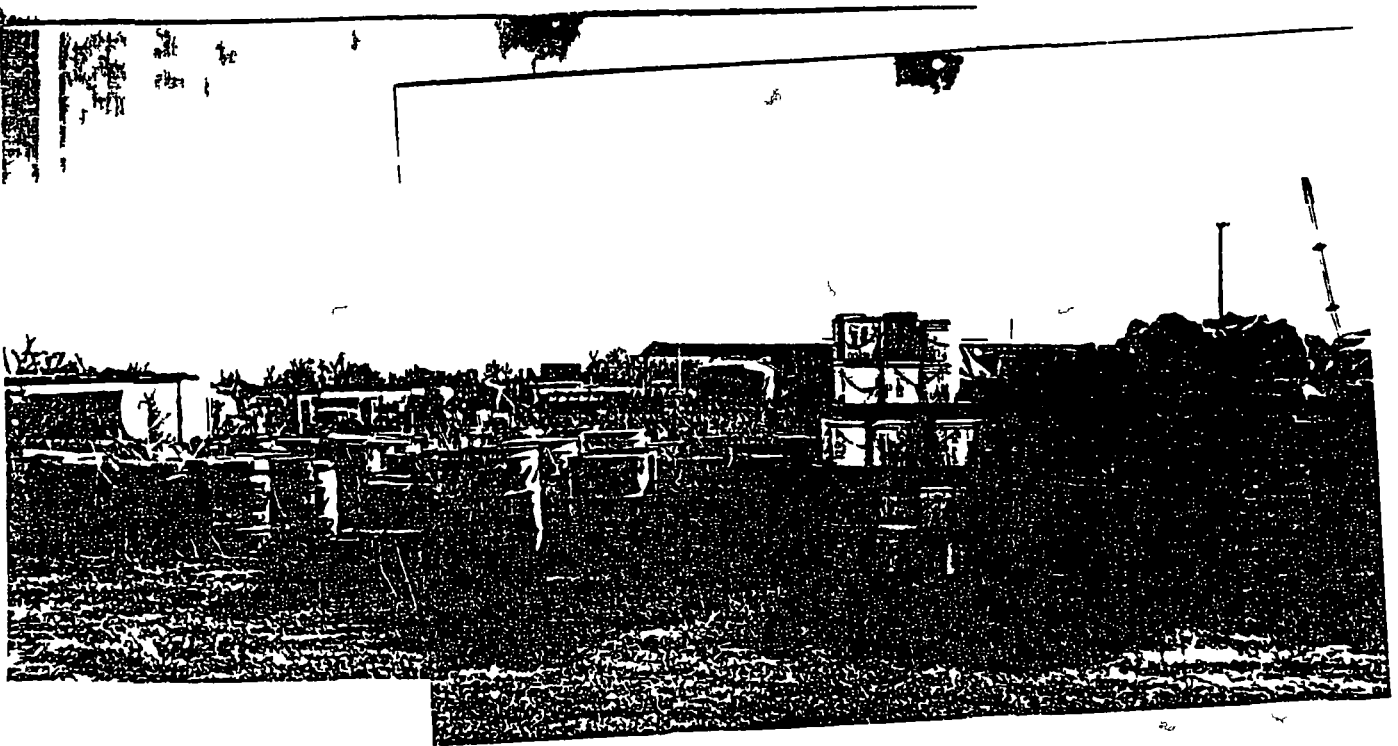
cc Linda Kuhn - District 7 Emergency Response Coordinator
Stennie Meadours - Superfund/Emergency Response Unit

COMPLAINT INVESTIGATION PHOTOGRAPH
TAKE BY ROBERT MUSICK ON 3-14-91



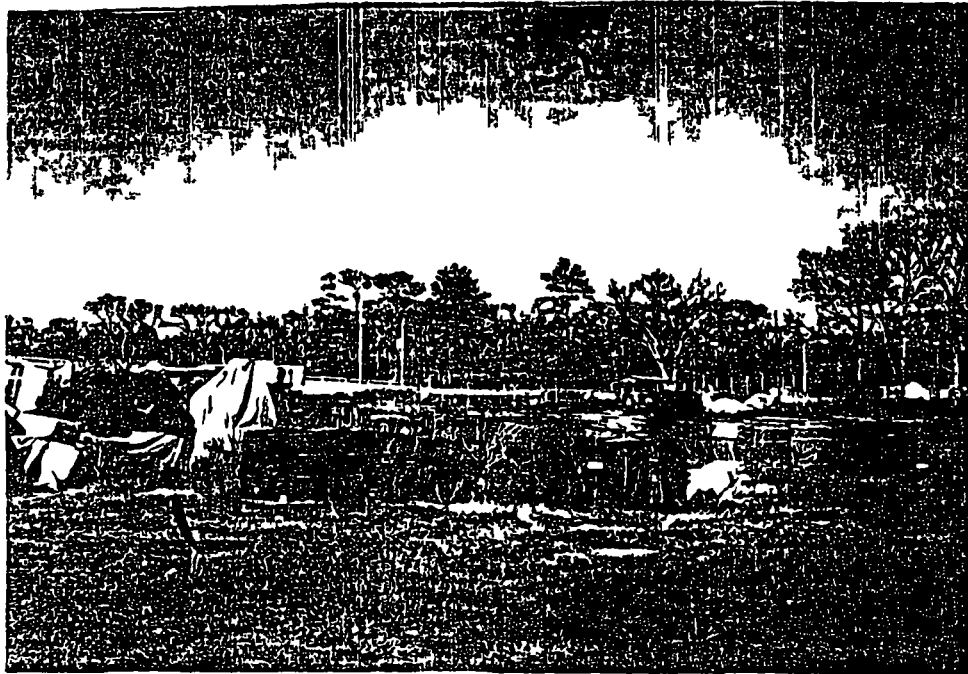
Photograph No 2 A panoramic view of the abandoned drums
looking in a northerly direction

COMPLAINT INVESTIGATION PHOTOGRAPH
TAKE BY ROBERT MUSICK ON 3-14-91



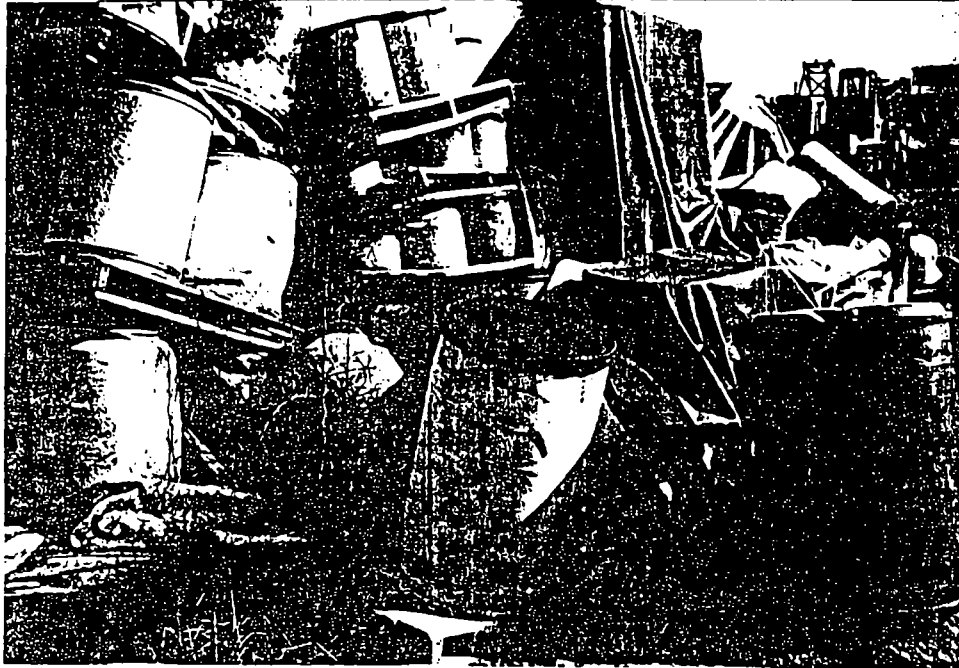
Photograph No 1 A panoramic view of the abandoned drums
looking in a southerly direction

COMPLAINT INVESTIGATION PHOTOGRAPH
TAKE BY ROBERT MUSICK ON 3-14-91



Photograph No 3 A photograph of the abandoned drums
looking in a northeasterly direction
Note the saturated oil from recent
rainfall in the bottom right corner of
the photograph

COMPLAINT INVESTIGATION PHOTOGRAPH
TAKE BY ROBERT MUSICK ON 3-14-91



Photograph No. 4: A photograph of several leaking paper fiber drums. Note the contaminated soil near the pallet. The photograph was taken looking in a easterly direction.

COMPLAINT INVESTIGATION PHOTOGRAPH
TAKE BY ROBERT MUSICK ON 3-14-91



Photograph No 5

A photograph of several leaking metal drums. Note that some of the waste has saturated the soil in the foreground of the photograph. The photograph was taken looking in a northwesterly direction.

COMPLAINT INVESTIGATION PHOTOGRAPH
TAKE BY ROBERT MUSICK ON 3-14-91



Photograph No. 6: A photograph of several leaking metal drums. Note the rust holes in the drum lids. The photograph was taken looking in a northwesterly direction.

COMPLAINT INVESTIGATION PHOTOGRAPH
TAKE BY ROBERT MUSICK ON 3-14-91



Photograph No. 7: A photograph of several leaking metal drums. Note the discolored soil near the pallet. The photograph was taken looking in a northwesterly direction.

REFERENCE 10

HARRIS COUNTY POLLUTION CONTROL DEPARTMENT

INVESTIGATION REPORT

INVESTIGATION DATE: February 1, 1991

TIME: 02:30 PM - 04:00 PM

ID 2347
Page Turbines International, Inc.
Mr. Craig McLerran
10836 Grissom Street, Suite 110
Dallas, TX 75229

RECEIVED
MAR 11 1991
DISTRICT 7

LOCATION OF INVESTIGATION: 11548 East Hardy Road (1.9355 acres in Tract 25A of Hahl Sites Survey)

KEY MAP: 413Q

PERSON CONTACTED: Craig McLerran

TITLE: Property owner TELEPHONE NO.: (214) 555-1212

WEATHER: Clear WIND DIRECTION: NE SPEED: 1-3 MPH

INVESTIGATOR: Patrick E. Pendleton

PHOTOS: Several

VIOLATION: Texas Water Code, Section 26.121 and Texas Water Commission, Municipal Hazardous Waste and Industrial Solid Waste Management Regulations, Section 335.4 (1)

NARRATIVE: This office received a complaint concerning the burial of hazardous wastes on the property at 11532 East Hardy Road. In the process of investigating this complaint, I noted that a large quantity of oil well chemicals and other chemicals stored in metal, paper fiber and plastic drums and paper bags sitting on pallets on the adjacent property at 11548 E. Hardy Road. This property has no residence or business located on it and no one was in attendance. Mr. Ray Dove the owner of the business at 11532 E. Hardy Road was accompanying me during my investigation. Mr. Dove said that Mr. Delbert Riley had owned the property about two years ago when the materials were abandoned at the site. I was told that Mr. Riley had died and left the property to his sister, Estelle Carter. Mr. Dove did not

February 1, 1991

know how to contact Ms. Carter. Mr. Dove said that the chemicals were delivered across his property to Mr. Riley's property, because there was no other way for a large truck to enter Mr. Riley's property. Mr. Dove stated that Clarence Melvo of C. Melvo Trucking Company had transported the containers of chemicals to the property and used a fork lift to remove the pallets loaded with chemicals. Mr. Melvo delivered the chemicals with the understanding that they would be transferred to another truck. However, when the second truck did not arrive, the chemicals were unloaded on Mr. Riley's property. Mr. Dove said that the chemicals came from the Mann Warehouse on Lockwood Avenue.

After completing my inspection of Mr. Dove's facility, we went to his office so that I could get further information about the materials on the Riley property. Mr. Dove told me that he had been interested in purchasing the materials stored in the Mann Warehouse, which were being sold through a public sale. He had gone to the warehouse to examine the materials. Mr. Dove stated that he recognizes the materials on Mr. Riley's property as the ones that he had seen in the warehouse. Mr. Dove said that he decided not to purchase the chemicals, but he learned that three men had purchased them. The three men were Charles Pete Miller, Jesse Jackson and Craig McLerran.

While I was at Mr. Dove's office, he called Mr. Clarence Melvo (673-6529), and I spoke with Mr. Melvo. Mr. Melvo said that he had transported the materials to the site on East Hardy for a man named James Moore, and he had not received payment for his services or been able to contact Mr. Moore. I asked Mr. Melvo if he had documents to show who had hired him to transport the materials. I was told that

he probably could not find the shipping manifests at this time. Mr. Dove had asked him the same question. Mr. Melvo had told him that if he found the documents he would send him a copy.

After talking with Mr. Dove, I returned to inspect the containers of chemicals closer. The following information was determined from the labeling on the containers:

1. Numerous bags of Anionic Cellulosic Polymer - drilling fluid additive.
2. Numerous fiber drums containing Alcoa Activated Alumina (400 lbs. per drum)
3. Many bags labeled Oilfaz
4. Many bags labeled Dowell Division of Dow Chemical
5. Many 5 gallon buckets labeled Caustidamp 1 - vibration damping coating
6. 12, 60 gallon salvage/recovery drums (contents unknown)
7. 11, plastic 55 gallon drums, some labeled Aqua Ammonia 26DE
8. About 100 rusty 55 gallon metal drums, some appeared to be leaking unknown contents.

I noted that several of the paper fiber drums and the paper bags were rotting and leaching salt like material on the ground. Some of the grass around the pallets had been killed. There also appeared to be leakage from some of the metal drums. The pallets that the containers are sitting on are rotting, which will accelerate the rusting process. I took several photos of the chemical containers and the spillage to document the conditions observed.

I called Mr. Gene Mann, the owner of G.M.I. Mann Warehouse at 4410 Clinton, phone number 675-1701, on 2-5-91 and questioned him

about the materials that were alleged to have been stored in his warehouse. Mr. Mann said that the chemicals came from his warehouse which was located on Lockwood at the time. Mr. Mann said that when his father died their business was left in debt to Lockwood Bank for a \$1,200,000.00 loan. Many of their assets, including the salvaged materials and chemicals which were being stored in their warehouse, had been provided as collateral for the loan. The bank had obtained an order (Cause No. 88-22192) from Judge Louis Moore, 281st Civil District Court, to sell the assets, listed as collateral, in a public sale. Mr. Mann said that sealed bids were accepted and Page Turbines had the highest bid. Mr. Mann identified the three men who owned the company. They were the same men that Mr. Dove told me purchased the materials. Mr. Mann further said that he tried to tell the judge that these men were not reputable and would not handle the hazardous materials properly. The judge had informed Mr. Mann that it was not his business what the men did with the materials. Mr. Mann said that the temporary injunction (see the attached copy of Defendants' Original Answer) specifically states that the materials are hazardous materials which have been under investigation by the Texas Water Commission and the Fire Marshal for violations of their regulations. The injunction further states that he has no further responsibility for the materials when they are received by Page Turbines, Inc. I also learned from Mr. Mann that the chemicals were removed from his warehouse in May of 1988. He was unable to find the exact date in his log book.

I asked Mr. Mann if he had any documents that would show the identity of the purchaser of the chemicals. Mr. Mann said that he

would speak to his attorney and determine if he has any usable documents. He said that he would provide me with copies of any documents that would help me. He also said that he would give me an inventory of the chemicals, which he made prior to the sale.

I went to Mr. Mann's office on 2-8-91 and again tried to get information and a bill of sale for the transaction concerning the chemicals. Mr. Mann supplied me with an inventory of the salvage chemicals and a legal document titled Defendants' Original Answer, Special Exceptions and Counter-Claim. Mr. Mann did not have a copy of the bill of sale.

I contacted Ms. Estelle Carter by phone on 2-8-91 and verified that she owns the property at 11548 E. Hardy Road. I informed Ms. Carter of my investigation and the findings of the investigation. Ms. Carter said that her brother, Delbert Riley, owned the property when the chemicals were placed on the site. Upon his death, she inherited the property. She asked me what should be done at this time. I informed her that the chemicals stored on her property are leaking on the ground and appear to be an eminent threat of water pollution. I told her that she must have the materials removed from the site and the spilled chemicals and contaminated soil properly disposed of. Ms. Carter said that her husband is retired and she does not make much money. She said that it is not possible for her to pay someone to clean up the property. I told Ms. Carter that she will be the primary responsible party for the clean up of the site, because she is the property owner. I informed her that I would complete my report, which will probably result in a violation notice being sent to her. I also told her that I have some leads on the people who

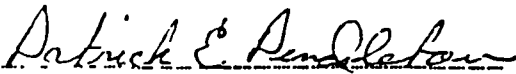
were responsible for abandoning the chemicals on the site, and I will continue to investigate the situation.

I obtained three Texas license plate numbers from Mr. Gene Mann that had been logged in for people entering the warehouse in April and May of 1980. The entries came from their log book, which Mr. Mann had retained in his files. Mr. James Moore had visited the warehouse driving a Cadillac (license no. 983 STB). Mr. Charles Pete Miller had visited the warehouse driving a Cadillac (license no. 192 KCF). Mr. Jesse Jackson visited the warehouse driving a GMC pick-up truck (license no. 606 BMC). The Harris County Tax office ran these numbers through their computer identifying the owners of two of the vehicles. Mr. Jesse Jackson was driving a vehicle registered to Page Turbines International, Inc. (PTI), (10836 Grissom Street, Suite 110, Dallas, Texas). The Cadillac that Mr. Charles Pete Miller was driving was registered to Ms. Sharon S. Partain (Rt. 5, Box 54K, Los Fresnos, Texas 78566). I obtained the phone number from information for PTI.

I called Mr. Craig McLerran at PTI, Inc. on 2-13-91 and identified myself as an employee of the Harris County Pollution Control Department. I told Mr. McLerran that I have been investigating the disposition of a large quantity of salvage chemicals that were purchased from Lockwood Bank in Houston and removed from the Mann Warehouse on Lockwood Avenue. Mr. McLerran acknowledged he, Charles Pete Miller and Jesse Jackson had purchased the products and materials that were being stored in the Mann Warehouse. Mr. McLerran said that Jesse Jackson was a 50% shareholder in PTI, Inc. at the time of the transaction, but his share of the stock was later purchased by the

corporation. He said that he owned the remaining stock at that time. He stated that Charles Pete Miller had found the deal so they teamed up with him in making the transaction. I informed Mr. McLerran that the salvage chemicals that PTI had purchased have been transported to and abandoned on private property located at 11548 E. Hardy Road in Harris County. I asked Mr. McLerran what part Mr. James Moore played in the activities. Mr. McLerran said that James Moore was supposed to have arranged to sell the salvage chemicals, which were only a portion of the materials in the warehouse, and provide for the removal of the materials from the Mann Warehouse. Mr. McLerran said that he thought the Mr. Moore had fulfilled his commitment and found a suitable buyer for the salvage chemicals. He further stated there were several large valves purchased along with the other items in the warehouse, which were sold and the proceeds divided between the three men. Mr. McLerran said that all of the other materials including the chemicals were to be sold by Mr. Pete Miller with the proceeds being kept by Mr. Miller. I told Mr. McLerran that the documents that I have seen state that the materials from the warehouse were purchased by Page Turbines, him, Charles Pete Miller and Jesse Jackson. Unless he can provide this office with other legal documents that prove that the salvage chemicals were the responsibility of another party or parties, Page Turbines International, Inc. will be a responsible party for the abandonment of the chemicals and liable for the remediation of the site and subject to civil prosecution for violations of the Texas Solid Waste Disposal Act. I also informed Mr. McLerran that the evidence indicated that Mr. James Moore and possibly other parties would be subject to criminal prosecution

for their involvement in the violations. I asked Mr. McLerran if he could provide me with information that would allow me to contact Mr. Jackson, Mr. Miller and Mr. Moore. Mr. McLerran said that Jesse Jackson was living in Oklahoma City (405)354-5385 and Pete Miller was living in the valley with a lady (512)463-5555. He said that he has no information on James Moore, and he said that Mr. Moore was a somewhat irresponsible person who probably moves around. Mr. McLerran said that he thought that he could find documents that will show the arrangements between him and his two partners. I recommended that he inspect the chemicals presently abandoned on the property mentioned earlier. Mr. McLerran made no commitment to inspect the site or to properly dispose of the chemicals.


Patrick E. Fendleton
Solid Waste Supervisor

PF/ing

NO 88 22192

PAGE TURBINES CRAIG McLERRAN
CHARLES PETE MILLER and
JESSE JACKSON

&

IN THE DISTRICT COURT OF

VS

&

HARRIS COUNTY TEXAS

G M I MANN WAREHOUSES INC
AND GENE MANN INDIVIDUALLY

&

334TH JUDICIAL DISTRICT

DEFENDANTS ORIGINAL ANSWER,
SPECIAL EXCEPTIONS AND COUNTER CLAIM

TO THE HONORABLE JUDGE OF SAID COURT

1

COME NOW G M I MANN WAREHOUSES INC and GENE MANN
individually Defendants in the above entitled and numbered cause and files this their
Original Answer and Special Exceptions to Plaintiffs Original Petition and Application for
Temporary Restraining Order and Temporary Injunction (Request for Expedited Hearing
on Temporary Restraining Order) and as grounds therefor would respectfully show the
Court the following

I

Defendants herein generally deny all allegations of Plaintiffs Original Petition
and demand strict proof of each and every allegation by a preponderance of the evidence
according to the law

II

Pursuant to Rule 93 of the Texas Rules of Civil Procedure Defendant GENE
MANN would show that he is not liable in the capacity in which he is sued

III

Defendants would show that Plaintiffs are not entitled to recover on the alleged contract in question since that contract is void and unenforceable due to failure of consideration

IV

The Defendants specially except to Paragraph III of Plaintiffs Original Petition on the grounds that Plaintiffs have failed to furnish Defendants with the partial list of said inventory equipment goods and property attached as Exhibit A and on the further grounds that the allegation in its entirety is over broad vague ambiguous and does not apprise these Defendants of how they allegedly wrongfully took the alleged complete set of inventory nor what comprises the complete set of inventory

V

Defendants specially except to Paragraph XVIII on the grounds that said pleading fails to state a cause of action recognized under the common law or statutes of the State of Texas

VI

Defendants specially except to Paragraph XIX of Plaintiffs Original Petition on the ground that said pleading does not specify what fiduciary obligation or duties were owed to Plaintiffs

VII

Plaintiffs have not complied with Texas Business and Commerce Code Annotated Section 17 50A as amended 1979 which is a prerequisite to filing suit under such Statute Specifically Plaintiffs have failed to provide written notice to Defendants thirty (30) days before suit was filed of Plaintiffs specific complaint and the amount of

actual damages and expenses including attorney's fees if any

VIII

Plaintiffs are not entitled to the Temporary Injunction requested on the grounds they have entered this forum with unclean hands

IX

In the event this Court finds that Plaintiffs are entitled to a temporary injunction your Defendants prays that they be required to post bond payable to said Defendants in the amount of a sum not less than \$250 000 00

WHEREFORE PREMISES CONSIDERED Defendants pray that the Plaintiffs take nothing by Plaintiffs suit against your Defendants that Defendants be discharged and for such other and further relief both general and special at law and in equity to which Defendants may be justly entitled

COUNTER CLAIM

NOW COME G M I MANN WAREHOUSES INC and GENE MANN individually hereinafter referred to as Counter-Plaintiffs in the above entitled and numbered cause complaining of CRAIG McLERRAN CHARLES PETE MILLER JESSE JACKSON and PAGE TURBINES hereinafter referred to as Counter-Defendants and for causes of action will show

I

On or about the 23rd day of October 1987 Counter-Defendants purchased at a public sale certain salvage inventory at a public auction sponsored by Lockwood National Bank of Houston The subject salvage inventory was purchased pursuant to a Notice of

Sale by Lockwood National Bank of Houston a copy of which is marked as Exhibit A and attached hereto for all purposes Counter-Defendants were unable to comply with the Notice of Sale requirement in removing the subject property from the premises by November 10 1987 and accordingly requested G M I MANN WAREHOUSES INC to store the property for Counter-Defendants Accordingly on or about October 29 1987 Counter-Plaintiffs and Counter-Defendants entered into an agreement for the storage of the subject property up until December 30 1987 A copy of this agreement is marked as Exhibit B and attached hereto for all purposes A portion of the salvage inventory purchased by Counter-Defendants contain certain hazardous materials which the parties specifically agreed would be removed from the premises by December 30 1987 Counter-Plaintiffs would show that Counter-Defendants wrongfully refused to remove said property from the premises pursuant to the terms of the agreement After the expiration of the Lease Agreement marked as Exhibit B the Counter-Defendants still refused to remove the hazardous materials and accordingly the parties entered into an additional agreement to store the subject property for the month of January 1988 It should be noted that under this Agreement the rent was increased to \$3 500 00 per month and was in fact paid by Counter-Defendants for the month of January 1988 Once again Counter-Defendants agreed to remove all hazardous materials from the property as soon as possible but continued to and failed to remove the hazardous materials from Counter-Plaintiffs property all in direct violation of the Agreement between the parties

II

On or about January 29 1988 Counter-Defendants received notice from the City of Houston Fire Department that they were in violation of the Codes and Ordinances

of the City of Houston with regard to the storage of the hazardous chemicals mentioned herein After receipt of said general fire inspection report Counter-Plaintiffs repeatedly requested Counter-Defendants to comply with their previous contractual obligation to remove the hazardous chemicals Counter-Defendants have continually refused to remove the chemical despite their contractual obligations both express and oral and have further continued to ignore the City of Houston Fire Departments Order concerning said chemicals As a direct and proximate result of Counter-Defendants refusal to remove the hazardous materials pursuant to City of Houston Fire Department Order Counter-Plaintiffs have been served with numerous citations by the City of Houston ultimately resulting in a warrant for Counter-Plaintiff's arrest

III

Counter-Plaintiffs would show that Counter-Defendants have totally breached the agreements between the parties and that as a result of said conduct Counter-Plaintiffs have been damaged in a sum far in excess of the minimal jurisdictional limits of this Court Additionally Counter-Plaintiffs would show that Counter-Defendants conduct with regard to their refusal or nonfeasance in removing the hazardous chemicals in question is negligence and is a direct and proximate cause of Counter-Plaintiffs damages which are far in excess of the minimal jurisdictional limits of this Court

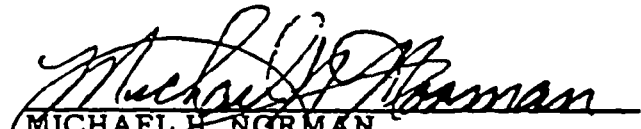
IV

Counter-Plaintiffs would show that Counter-Defendants have initiated this action pursuant to D T P A §17 50(a) which is groundless and is brought in bad faith for the purpose of harrassment

WHEREFORE PREMISES CONSIDERED Defendants/Counter-Plaintiffs pray that Plaintiffs/Counter-Defendants take nothing by way of their suit that their request for temporary injunction be denied that Counter-Plaintiffs pray for Judgment against Counter-Defendants for their damages to be proved with more exactness at time of trial for attorneys fees costs of Court for pre-judgment and post judgment interest as provided by law and for such other and further relief to which Defendants/Counter-Plaintiffs may show themselves to be justly entitled


Respectfully submitted

LAW OFFICES OF
MICHAEL H NORMAN


MICHAEL H NORMAN
15081300
3636 San Jacinto
Houston Texas 77004
524-3636
ATTORNEYS FOR DEFENDANTS

CERTIFICATE OF SERVICE

I hereby certify that on this the 27 day of April 1988 I forwarded a true and correct copy of this instrument to opposing counsel by HAND DELIVERY


MICHAEL H NORMAN

THE STATE OF TEXAS
COUNTY OF HARRIS

)(
)(

BEFORE ME the undersigned authority on this day personally appeared GENE MANN who after having been duly sworn stated on oath that he has read the foregoing Paragraph II of Defendants Original Answer and that the statements contained therein is true and correct

Gene Mann
GENE MANN

SWORN TO AND SUBSCRIBED before me by the said GENE MANN on the
_____ day of April 1988

Brenda Kyle
NOTARY PUBLIC IN AND FOR
HARRIS COUNTY TEXAS

PRINTED NAME OF NOTARY

Brenda Kyle

MY COMMISSION EXPIRES

8-4-89

REFERENCE 11

194 - 1874

HARRIS COUNTY POLLUTION CONTROL DEPARTMENT COMPLAINT

DATE 1 31 91 DAY Thursday TIME 3 48⁷ pm BY R Graham
 NAME Anonymous PHONE NG EXT
 ADDRESS Not given ZIP

REFERRED BY AGENCY BACRC PERSON Larry Cork
 COMPLAINT RECEIVED BY REFERRING AGENCY DATE 1 31 91 TIME 3 30 pm

TYPE OF POLLUTION WATER AIR SOLID WASTE ☒ OTHER Bu al of Haz. Waste

COMPLAINT AND LOCATION The complainant stated that drums of Hazardous
Wastes are being buried at Card Blanc Services of America,
Inc located at 11532 Hardy Rd (442-8493).
The owner is Ray Dove.

KEY MAP 413Q

COMPLAINANT SUSPECTS

GIVEN TO P E Pendleton BY PEP AT 8 30 am DATE 2 1 91

INVESTIGATION DATE 2 1 91 TIME SPAN FROM 2 30 pm TO 4 00 pm
 WIND DIRECTION NE PEED 1-3 MPH WEATHER CONDITIONS clear
 COMPLAINANT CONTACTED? No

VIOLATION FOUND yes

SUBJECT OR REPORT Page Turbines International, Inc.

VIOLATION NOTICE SENT? YES NO DATE

VIOLATION ALLEGED Ti Water Code, Sec 26.121 & TWC, MH& ISUMR, Sect 335.4C

SYNOPSIS OF INVESTIGATION

Other reports resulting from this investigation
1. Card Blanc Services of America, Inc
2. Estelle Carter

REFERENCE 12

T.44660 -5



HARRIS COUNTY
POLLUTION CONTROL
DEPARTMENT

A. R. PEIRCE
DIRECTOR

February 1 1991

VIOLATION NOTICE

Mr Ray Dove
Card Blanc Services of America Inc
11532 East Hardy Road
Houston Texas 77093

Dear Mr Dove

This violation is described below constitutes a violation of the Texas Department of Health Municipal Solid Waste Management Regulations as promulgated by that agency under the authority of the Texas Solid Waste Disposal Act Article 4477.7 Vernon's Texas Civil Statutes as amended. You are requested to inform this office in writing within ten days of steps being taken to eliminate the cause of this violation and to prevent recurrence.

DATE OF VIOLATION February 1 1991

NAME OF OFFENDER Card Blanc Services of America Inc

LOCATION OF OFFENSE 11532 East Hardy Road

PERSON CONTACTED Mr Ray Dove

NATURE OF VIOLATIONS

325.22 Storage Requirements All solid waste shall be stored in such a manner that it does not constitute a fire safety health hazard provided a safe place for animal and vectors and shall be contained or banded so as not to result in litter. It shall be the responsibility of the occupant of a residence or the owner or manager of an establishment to utilize storage containers of an adequate size and strength and in sufficient numbers to contain all solid waste that the residence or other establishment generates in the period of time between collections. Stationary compactor units the waste from which is designated for disposal at a Type IV landfill must receive a special permit in accordance with procedures and requirements established in Section 325.25 of this title (relating to Requirements for Stationary Compactors).

VIOLATION NOTICE
Mr Ray Dove
Card Blanc Services of America Inc
February 15 1991
Page 2

Spilled oil and oil contaminated oil are defined as solid waste. The oil and oil contaminated oil must be removed from the site and transported to an authorized disposal facility to prevent the contaminants from polluting any water in the State.

The Texas Solid Waste Disposal Act Section 8(a)(1) subjects any person who violates any provision of this act or any rule permit license or other order of the Texas Department of Health to civil penalties of \$100 to \$25 000 for each act of violation and for each day of violation as a court of law may deem proper.

Should you have any questions concerning this Violation Notice please call Patrick E Pendleton at (713) 920 2831.

Very truly yours

A R Peirce
Director

ARP/PEP/jmo

HARRIS COUNTY POLLUTION CONTROL DEPARTMENT

INVESTIGATION REPORT

INVESTIGATION DATE: February 1, 1991

TIME: 01:50 PM - 04:00 PM

ID 2337

Card Blanc Services of America, Inc.
11532 East Hardy Road
Houston, TX 77093

LOCATION OF INVESTIGATION: 11532 E. Hardy

KEY MAP: 413Q

PERSON CONTACTED: Mr. Ray Dove

TITLE: Owner

TELEPHONE NO.: 442-8493

WEATHER: Clear WIND DIRECTION: NE SPEED: 1-3 MPH

INVESTIGATOR: Patrick E. Pendleton

PHOTOS: Several

VIOLATION: Texas Department of Health Municipal Solid Waste Management Regulations, Section 325.22 - improper storage of solid wastes (spilled oil)

NARRATIVE: This office received a complaint alleging that hazardous wastes are being buried on the property at 11532 E. Hardy Road, owned by Card Blanc Services of America, Inc. (CBSA). I drove to the site, which appeared to be a large storage yard for heavy equipment, truck trailers and machinery. I decided to look at the yard from the back side before contacting anyone at the site.

I drove to the northeast corner of the site and noted that the wooded area behind the yard had been cleared outside the fence line. I walked along the fence and observed the yard. I noted two potential problems near the back of the property. I first noted a small pit dug near the back fence which was being used as a disposal site for rubbish and oil filters. I later learned that the pit was on property owned by Ms. Estelle Carter. However, the rubbish and oily

materials appeared to be generated at the shop at CBSA. About one hundred and fifty feet from the southeast corner of the property, I noted eighteen (18) fifty five gallon drums, being stored on the ground adjacent to the east fence, which were leaking oil onto the ground. Some of the oil had already been washed under the fence onto the adjacent property by storm water. There were no surface water drainage ditches near the spill, therefore, no potential surface water pollution was likely. I then walked back to my car to get my camera. I was met by a young man, Ray Dove, Jr., who asked if he could help me. I identified myself and asked if he knew the owner of the property that I was looking at. He informed me that his father owned part of the property. I asked him to accompany me, and we walked along the fence line. I pointed out the small pit to him. He said that the pit was located on property north of their property line. I pointed out the leaking drums and informed him that the spilled oil must be cleaned up and properly disposed of. I took photos of the oil drums and the open pit. I told Mr. Ray Dove, Jr. that I needed to speak to his father and complete my inspection of the property.

I drove to the office and contacted Mr. Ray Dove. I informed him that our office had received a complaint, and I needed to inspect his facility. I asked Mr. Dove what types of solid wastes they generated. He informed me that they only generate rubbish and office wastes. I pointed out the pit, which was about 12 X 6 feet in size, located near the back on east fence. Mr. Dove said that the pit was on property (11548 E. Hardy Road) belonging to Ms. Estelle Carter,

the sister of Delbert Riley who had died recently and left the property to Ms. Carter. He did not acknowledge that his people were dumping the wastes in the pit. He did state that he had rented the property in the past but no longer rented the site or had any need for the property. The pit appeared to have about 1 to 2 cubic yards of rubbish in it. I informed Mr. Dove that disposal of solid wastes by burial was not allowed without a permit from the Texas Department of Health. I saw no evidence that any large containers had been buried in the pit or the area on the north side of the yard. There was no fence along part of the boundary between Mr. Dove's property and Ms. Carter's property.

While on the north side of the facility, Mr. Dove showed me a large group of drums and several pallets stacked high with bags of chemicals, which were all deteriorated badly. He said that these materials were placed on Ms. Carter's property about two years ago. I will address this problem in a separate report titled Estelle Carter.

I next showed Mr. Dove the leaking drums on the east side of his property. The drums were surrounded by various equipment and were barely visible from inside the yard. Mr. Dove said that he was aware of the drums which contain gear oil. I informed Mr. Dove that he must store the product in containers that do not leak, and the contaminated soil must be cleaned up and disposed of properly. I informed Mr. Dove that allowing the oil, a solid waste, to stay on the ground represented improper storage of the solid waste and a violation of the TDH, Municipal Solid Waste Management Regulations. Mr. Dove agreed to take care of this problem. I walked across the property and examined the entire site for any evidence that solid wastes are

INVESTIGATION REPORT
Card Blanc Service of America, Inc.
February 1, 1991

being buried on this property. I found no soil that had been disturbed recently on the property. Most of the yard had aggregate over its surface to facilitate the movement and storage of the large equipment. I noted that a large shop was being used to rebuild industrial type trailers, dozers and fork lifts. No other pollution violations were noted on the property.


Patrick E. Pendleton
Solid Waste Supervisor

PEP/jmo

HARRIS COUNTY POLLUTION CONTROL DEPARTMENT COMPLAINT

DATE 1 31 91 DAY Thursday TIME 3 45 pm BY R Gorham
 NAME Anonymous PHONE N/A EXT
 ADDRESS N/A ZIP

REFERRED BY AGENCY BAGC PERSON Larry York
 COMPLAINT RECEIVED BY REFERRING AGENCY DATE 1 31 91 TIME 3 30 pm

TYPE OF POLLUTION WATER AIR SOLID WASTE ✓ OTHER Burial of Hazardous
 COMPLAINT AND LOCATION The complaint stated that Hazardous

waste is being buried on Card Blanc Services of America
Inc. located at 11512 Hardy Toll Rd (442 8493).

The owner of the property is Ray Dye. The waste
is being buried in drums (5 pages of complaint attached)

Mr York, BAGC, wants to be notified of the results of
the investigation KEY MAP 113Q

COMPLAINANT SUSPECTS Card Blanc Services of America, Inc.

GIVEN TO PE Perdue BY PEP AT 8 30A DATE 2 1 91

INVESTIGATION DATE 2 1 11 TIME SPAN FROM 1 30 pm TO 4 00 pm

WIND DIRECTION NE SPEED 13 MPH WEATHER CONDITIONS clear

COMPLAINANT CONTACTED? no

VIOLATION FOUND yes

SUBJECT OF REPORT Card Blanc Services of America, Inc.

VIOLATION NOTICE SENT? YES NO DATE

VIOLATION ALLEGED TDH, Municipal Solid Waste Mgmt. & Regs., Section 325.22

SYNOPSIS OF INVESTIGATION See Report

1. Larry York (BAGC) and Mr Zafar Iqbal (City SH for
Solid Waste Inspection) were notified of the findings of my investigation

On Friday (2/19/0) at 8:30 AM Larry York of the BAAQ called to update a complaint taken by R. Graham of this Department concerning Card Blanc, Services of America Inc. Mr. York informed me (Tim Duffley) that the material in the drums is tetraethyl lead, an acutely toxic hazardous waste. He then went on to reiterate the information given to Investigator Graham relative to the company and owner and site.

REFERENCE 13

T147511 30



**HARRIS COUNTY
POLLUTION CONTROL
DEPARTMENT**

**A. R. PEIRCE
DIRECTOR**

April 8, 1991

VIOLATION NOTICE

Mr. Ray Dove
Card Blanc Services of America, Inc.
11532 East Hardy Road
Houston, Texas 77093

Dear Mr. Dove:

The circumstances described below constitute violations of the Texas Health and Safety Code. You are requested to inform this office in writing within ten days of steps being taken to eliminate the cause of these violations and to prevent recurrence.

DATE OF VIOLATIONS: March 28, 1991

NAME OF OFFENDER: Card Blanc Services of America, Inc.

LOCATION OF OFFENSES: Property north of 11532 East Hardy Road

PERSON CONTACTED: Mr. Ray Dove

NATURE OF VIOLATIONS:

Section 361.223(a) - A person may not cause, suffer, allow, or permit the collection, storage, handling, transportation, processing, or disposal of solid waste or the use or operation of a solid waste facility to store, process, or dispose of solid waste or to extract materials under Section 361.092 in violation of this chapter or a rule, permit, license, or other order of the Texas Department of Health, or a county or a political subdivision exercising the authority granted by Section 361.165 in whose jurisdiction the violation occurs.

Illegal outdoor burning in violation of Texas Air Control Board Regulation I, Rule 111.101.

VIOLATION NOTICE
Card Blanc Services of America, Inc.
April 8, 1991
Page 2

Should you have any questions concerning this Violation Notice, please call Patrick E. Pendleton at (713) 920-2831.

Very truly yours,

A. R. Peirce
Director

ARP
ARP/PEP/jmo

HARRIS COUNTY POLLUTION CONTROL DEPARTMENT

INVESTIGATION REPORT

INVESTIGATION DATE: March 28, 1991

TIME: 04:03 PM - 04:38 PM

ID 2337

Card Blanc Services of America, Inc.
11532 East Hardy Road
Houston, TX 77093

LOCATION OF INVESTIGATION: 11532 and 11546 E. Hardy Road

KEY MAP: 413L

PERSON CONTACTED: Ray Dove

TITLE: Owner

TELEPHONE NO.: 442-6493

WEATHER: Partly Cloudy WIND DIRECTION: S SPEED: 5 MPH

INVESTIGATOR: Paul D. Gibbins

PHOTOS: 2

VIOLATION: Title 5, Texas Health and Safety Code, Section 361.223,
Texas Air Control Board Regulation 1, Rule 111.101 - Il-
legal Outdoor Burning

NARRATIVE: Our office received the attached complaint alleging that a business, Card Blanc Services of America, Inc., was conducting outdoor burning. The business is located at 11532 E. Hardy Road. The complainant stated that he observed the fire at the northeast corner of the property.

Upon arriving in the area, I observed moderate amounts of black smoke emanating from a vacant piece of property located at 11546 E. Hardy Road. A prior HCFCD investigation revealed that this property is owned by Mrs. Estelle Carter. Card Blanc Services of America, Inc., owns the adjacent property on the north and south side of this property. I then entered the property and noted that an employee of

Card Blanc Services of America, Inc., was overseeing the fire. The employee was a Hispanic male, 5 feet 11 inches tall, weighing 175 pounds with black hair and a dark complexion in his middle 40's. The employee could not speak English, but indicated that he worked for Mr. Ray Dove, the owner of Card Blanc Services of America, Inc. The fire was located at the western edge of a small pit at the rear of the property. The fire was approximately 3.5 feet tall and 9 feet in diameter. The burning debris consisted of carpet padding, scrap lumber, and metal cans. I also noted burned debris in the pit, which consisted of mattress springs, household garbage, and large oil filters. While inspecting the pit, the employee left the fire and returned to Card Blanc Services of America, Inc., at 11532 E. Hardy Road. The employee then began working on a large truck in a shop at the business. I noted there was not a complete fence that divided these two properties. I also observed tire tracks at the pit which originated from Card Blanc Services of America, Inc. Two photographs were taken to document the fire and the debris in the pit.

I then proceeded to 11532 E. Hardy Road and attempted to contact Mr. Ray Dove. I was informed by Mr. Bryan Gilpan, an accountant for the business, that Mr. Dove was not at the site. I informed Mr. Gilpan of my investigation and described the person I observed at the fire. He stated that he was unaware of the fire and agreed to have it extinguished. He also stated the person I observed was an employee of the business, and that his first name is Phillippe. Mr. Gilpan stated he would inform Mr. Dove of my investigation and reiterated that they would extinguish the fire.

INVESTIGATION REPORT
Card Blanc Service of America, Inc.
March 28, 1991

On April 1, 1991, I contacted Mr. Dove and explained my investigation to him. Mr. Dove stated that the person I observed at the fire was an employee of another company that was working at the business. I informed him that it was prohibited by HCD Regulations to conduct outdoor burning at a business. I also informed him that it was a violation of the Texas Health and Safety Code to dispose of solid waste from the business in the pit. He stated he would inform his employees of the problems I noted to prevent them from reoccurring. I then explained that the business would receive a Violation Notice from HCFCD for the two problems I observed at the property during this investigation.

Paul D. Giblin
Paul D. Giblin
Investigator

PDG/jmo

HARRIS COUNTY POLLUTION CONTROL DEPARTMENT COMPLAINT

DATE 3 28 91 DAY Thursday TIME 2:00pm BY L. Sincrop
 NAME Ms. Anonymous PHONE EXT
 ADDRESS ZIP

REFERRED BY AGENCY B A Q C PERSON Debbie Coven's

COMPLAINT RECEIVED BY REFERRING AGENCY DATE 3 28 91 TIME 12:25 pm

TYPE OF POLLUTION WATER AIR ☒ SOLID WASTE OTHER

COMPLAINT AND LOCATION They received an anonymous complaint that a company was doing outdoor burning. A BAQC investigator, Ricky Wilson was called & responded. He spoke with Ray Dore, Mgr at the suspected source. Was told no burning was being done left site, observed a smoking fire (from an elevated Hwy) in the far North + east corner of their property. As he has no jurisdiction, he referred it to us. KEY MAP 413-L

COMPLAINANT SUSPECTS Card Blanc Services, Ray Dore, 442 8493, 11532 E Hardy
 GIVEN TO P. G. B. W. S. BY L. Sincrop AT 2:45p DATE 3 28 91

INVESTIGATION DATE 3 28 91 TIME SPAN FROM 4:03 p.m. TO 4:38 p.m.

WIND DIRECTION SE + W P ED 5 MPH WEATHER CONDITIONS Partly Cloudy

COMPLAINANT CONTACTED? no

VIOLATION FOUND yes

SUBJECT OF REPORT Card Blanc Services of America, Inc.

VIOLATION NOTICE SENT? YES NO DATE

VIOLATION ALLEGED Title 5, Texas Health and Safety Code, Section 361.223, TACB Reg 1 + 2 I

SYNOPSIS OF INVESTIGATION see report L Rule III 101 - III gal Outdoor Burning

REFERENCE 14

CASE# FY92-0806

JUN 7 1993

**SITE ASSESSMENT REPORT
FOR
Card Blanc Salvage Site
Near Houston Harris County Texas**

January 31 1991

Prepared for

**J Chri Pete sen
Deputy Project Office
Emergency Response Branch
EPA REGION 6**

Contract Number 68-WO-0037



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International Specialists in the Environment

CASE FY92-0806

DATE: January 31, 1991

TO: Gary Guerra, OSC
EPA Region 6, Emergency Response Branch

THRU: J. Chris Petersen, DPO
EPA Region 6, Emergency Response Branch

THRU: Kishor Fruitwala, TATL
Region 6, Technical Assistance Team

FROM: John I. Hogue
Region 6, Technical Assistance Team

SUBJ: Site Assessment Report: Card Blanc Salvage Site (a.k.a.
East Hardy Road Site)
Near Houston, Harris County, Texas
TDD# T06-9112-005A
PAN# ETX1325SA

I. PURPOSE

The Ecology and Environment, Inc. Technical Assistance Team (TAT) was tasked on December 12, 1991 with conducting a site assessment at the Card Blanc Salvage (CBS) Site. The site was formally known as the East Hardy Road Site; however, the site name was later changed to avoid confusion with another similar site name. Specific elements of the site assessment included an on-site assessment, contacting the Texas Water Commission (TWC) for information, performing written and photo documentation, characterizing the potential for imminent and substantial endangerment to the public health or the environment, briefing the OSC following/during the assessment, and conducting sampling if deemed necessary by the OSC to characterize the magnitude and the extent of contamination. The initial site assessment was conducted on December 13, 1991. TAT members David Beeson, Bruce Ridpath, and John Hogue conducted the assessment. Drive-by assessments were conducted on December 16 and 18, 1991 to monitor reported changes in site conditions. A final comprehensive sampling assessment was conducted on January 2 - 3, 1991. TAT members Megan Fedders, Roberta Haglund, Satish Reddy, Joe Cornelius, Mariano Gomez, David Beeson, and John Hogue participated in the sampling.

II. BACKGROUND

The CBS site located at 11548 East Hardy Road near the intersection of the Hardy Toll Road and Collins Road in northeast Harris County, Texas (Attachment A - Site Location Map). The site was originally reported to the Harris County Pollution Control Department (HCPCD) in February, 1991 by Mr. Ray Dove. Mr. Dove currently operates Card Blanc Salvage on the property adjacent to the site. HCPCD referred the site to the TWC in March 1991. The TWC conducted a site visit and prepared a report (Dated October 31, 1991) requesting that a state funded cleanup be conducted at the site. TWC referred the site to the US Environmental Protection Agency (EPA) Emergency Response Branch (ERB) when it became apparent that immediate actions might be necessary to control contaminant migration offsite.

According to the TWC report (Attachment L), the materials were originally part of a shipment which was to be salvaged. The owners of the material stated that the salvage materials had been sold to a Mexican company. The material was to be transported to the CBS site to be sorted and repackaged prior to shipment. Once the material was staged at the Hardy Road location, no further action was taken.

III. ACTIONS TAKEN

TAT members David Beeson, Bruce Ridpath, and John Hogue conducted the initial site assessment on December 13, 1991. Several level B entries were conducted to perform ambient air monitoring and characterize the wastes on-site. Approximately 116 55-gallon and 85-gallon steel drums were noted. Many of these were deteriorating and spillage from these drums was noted. Several of the drums were observed to have polyethylene (poly) liners used to contain potentially corrosive liquids inside steel drums. Nine (9) 55-gallon poly drums were also noted bearing labels identifying the contents as "aqua ammonia" and "glacial acetic acid." Although some "Flammable and Combustible Liquid" labels were observed, the majority of the drums were not labeled. Other specific chemical labels observed included furfuryl alcohol and ethylene glycol. Hazard categorization using Spilfyter Test Strips indicated the presence of mildly acidic and basic compounds, as well as, petroleum products.

Over 100 5-gallon poly containers were observed staged on pallets and scattered over the site. Label information could not be recovered from the majority of these containers; however, one container was labelled "Cousti-Damp" (a non-hazardous anti-vibration agent).

A number of 35-gallon fiberboard drums were observed. Originally these had been staged under a tarp. Many of the drums have become uncovered, are now wet, and are rapidly deteriorating. Several drums were labelled "activated alumina" which is an intermediate product in the production of aluminum.

Numerous 40-60 pound sacks of material were noted on pallets near the abandoned drums. Label information from these sack was very difficult to obtain as the sacks have deteriorated.

The initial assessment was conducted during periods of heavy rainfall. The TAT conducted initial ambient monitoring for organic vapors and ionizing radiation. No readings above background were observed. Site drainage flows to the south where it enters a shallow depression. From there it flows to the eastern property boundary and moves northward towards Collins Road where it enters a local storm water sewer (Attachment B - Site Sketch).

The site is proximal to the intersection of the Hardy Toll Road and Collins Road. The nearest residence is located +/- 300 yards to the northeast. Nearby residents are reported to be on individual water wells as the property is located just outside the city limits of Houston in an unincorporated area of Harris County. Records of drillers logs from other wells in the area indicate the first potential source of groundwater is at a depth of approximately 70 feet.

A second investigation was conducted at the CBS site on 2-3 January 1992. TAT members Megan Fedders, Roberta Haglund, Satish Reddy, Joe Cornelius, Mariano Gomez, David Beeson, and John Hogue participated in the assessment. The TAT activities included the collection of drum liquid samples for field hazard categorization, subsequent collection and shipment of characteristic drum samples, and the collection of biased soil samples from obvious surface migration pathways. Prior to drum assessment operations, the TAT conducted perimeter air monitoring detecting no organic vapors above background in the breathing zone. Concurrent with drum opening operations, the TAT conducted drum headspace monitoring for organic vapors. Concentrations in excess of 1000 units (methane equivalent) ranging down to five (5) units were observed while opening the drums.

Twelve (12) liquid and six (6) solid samples were collected for hazard categorization. The results are included as Attachment K. The materials collected ranged in pH from 4 - 12. The liquids ranged in color from clear and non-viscous to black and very viscous. Three (3) samples were determined to be flammable liquids. Two (2) other samples were determined to be basic liquids (pH = 12). The solid samples proved to be non-characteristic except for a single flammable sample.

A number of containers were in such poor condition that they could not be opened using available equipment and then be secured after the samples were taken. In addition, several bulging drums were also noted. None of these drums was addressed by TAT.

TAT collected six liquid and four soil samples to be analyzed by PDP Analytical Services in Spring, Texas under a TAT Analytical Projects TDD (T06-9112-12). Containers to be sampled were selected based upon the hazard categorization results and in an effort to obtain a representative collection of the matrices encountered. Soil sample locations (See Attached Site Sketch) were selected by the OSC to provide a representative assessment of the primary off-site migration pathway. All samples were to be analyzed for volatile organics, acid-base-neutral (ABN) compounds, pesticides, PCBs, and Target Compound List (TCL) metals.

The analytical results are summarized in Attachment H. The complete raw analytical data is included as Attachment I under a separate cover. Methylene chloride, hexane, acetone, benzene, toluene, ethylbenzene, and xylene were among the volatile analytes reported. Semi-volatile compounds detected included phenanthrene and phenol. Pesticide compounds detected included 4,4 - DDT and aldrin, lindane and chlordane in three of the four soil samples. Metals analyses were unremarkable.

ATTACHMENTS:

- A. Site Location Map
- B. Site Sketch
- C. Mounted Photographs
- D. Unused Photographs
- E. Logbook Copies (1-15, 38, 40-44, 46)
- F. Record of Communication (1 page)
- G. Draft Quality Assurance Sampling Plan (9 pages)
- H. Analytical Data Summary
- I. Analytical Data Package (Included under separate cover)
- J. POLREPS 1 & 2
- K. Hazard Categorization Results - Streamline Summary
- L. Texas Water Commission Report (Dated October 31, 1991) (55 pages)
- M. TDD Copy T06-9112-005 and Amendment A

ATTACHMENT H -- ANALYTICAL SUMMARY

ANALYTICAL DATA SUMMARY CARD BLANC SALVAGE SITE

ANALYSIS ORGANICS (UG/KG)	DRUM 1	DRUM 2	DRUM 3 T	SAMPLE LOCATION		DRUM 5	DRUM 6	SOIL 1	SOIL 2	SOIL 3	BACKGROUND
				DRUM 3 B	DRUM 4						
METHYLENE CHLORIDE	390560	107930	3276000 J	639800 J	29200 J	559900 J	63800 J	238500 J	196425 J	222562 J	193025 J
XYLENE (TOTAL)	18900 J	60260	297775	9767 J	8249100	40200 J					
ACETONE		114650									
TOLUENE		11340	40625		250600						
ETHYLBENZENE		13060	47800		1110400						
BENZENE			147550								
TENTATIVELY IDENTIFIED COMPOUNDS											
HEXANE	128125 J			76865 J		8750 J		47500 J	37500 J	51250 J	38750 J
ALKYLBENZENE		5375000 J	5025000 J		11250 J						
ACETIC ACID							550000 J				
UNKNOWN HYDROCARBONS		111875 J	3385000 J	442445 J	108125 J	5000 J	20500000 J				
UNKNOWN (*)	1125000	14681250 J	570000 J	61866 J		9375 J	4880000 J				
SEMI VOLATILES (UG/KG)											
PHENANTHRENE			94000								
PHENOLS					140000						
TENTATIVELY IDENTIFIED COMPOUNDS											
ALKYLBENZENE					530000 J				20000 J		
UNKNOWN PNA'S				26000 J							
UNKNOWN HYDROCARBONS			5860000 J	642000 J	8800000 J		4940000 J				2333 J
UNKNOWN (*)	138000 J	3380000 J	1530000 J	252000 J	9310000 J	130000 J	10540000 J	7666 J	1032000 J	34164 J	39997 J
PESTICIDE/PCB (UG/KG)											
4, 4 DDT			465								
ALPHA CHLORODANE									4936	31 J	56 J
GAMMA CHLORODANE									2215		6 J
ALDRIN									478		
GAMMA-BHC(LINDANE)									969		

J - INDICATES ESTIMATED VALUE BASED ON ANALYTICAL QA/QC PROTOCOLS

ALL BLANKS SHOULD BE CONSIDERED AS NON DETECTABLE CONCENTRATIONS

TENTATIVELY IDENTIFIED COMPOUNDS ARE THOSE COMPOUNDS WHICH ARE NOT ON THE TARGET COMPOUND LIST FOR THAT SPECIFIC ANALYSIS

* - INDICATES SUMMATION OF ALL REPORTED UNKNOWN FOR EACH SPECIFIC GROUP

REFERENCE 15

7 - 51 38

DRAFT

CERCLIS# TXD988061446

**REMOVAL FUNDED REPORT
FOR
CARD BLANC/CARTER SITE
Houston, Harris County, Texas**

June 18, 1993

Prepared for:

**J. Chris Petersen
Deputy Project Officer
Emergency Response Branch
EPA - Region 6**

Contract Number: 68-WO-0037



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International Specialists in the Environment

CERCLIS# TXD988061446

Date: June 18, 1993

To: Warren Zehner, OSC
EPA Region 6, Emergency Response Branch

Thru: J. Chris Petersen, DPO
EPA Region 6, Emergency Response Branch

Thru: Chris Quina, TATL
Region 6, Technical Assistance Team

From: Roberta Haglund
Region 6, Technical Assistance Team

Subj: Removal Funded Report: Card Blanc/Carter Site
Houston, Harris County, Texas
TDD# T06-9210-69
PAN ETX1325FAA

I. INTRODUCTION

During the periods of October 6, 1992 through November 28, 1992 and March 29, 1993 through April 13, 1993, the Technical Assistance Team (TAT) assisted the Region 6 Environmental Protection Agency-Emergency Response Branch (EPA-ERB) in conducting a removal action at the Card Blanc/Carter Site in Houston, Harris County, Texas. The TAT was tasked by EPA to provide technical support in the following areas: 1) maintain daily logbook of site activities, 2) photodocument site activities; 3) conduct on-site air and soil sampling; and 4) analyze samples for polychlorinated biphenyls (PCBs), pesticides, volatile organics, semi-volatiles, metals and cyanides.

II. SUMMARY OF TAT ACTIVITIES

During the removal at the Card Blanc/Carter Site, the TAT provided specific assistance in the following activities 1) maintain site documentation and site log, 2) photodocumentation of site activities; 3) removal contractor monitoring, 4) community relations support and plan development, 5) perform Response Contractor Monitoring System support, 6) send out weekly POLREPs, 7) act as

overall site safety officer; 8) collect appropriate air and soil samples; 9) provide formal report; 10) provide OSC report.

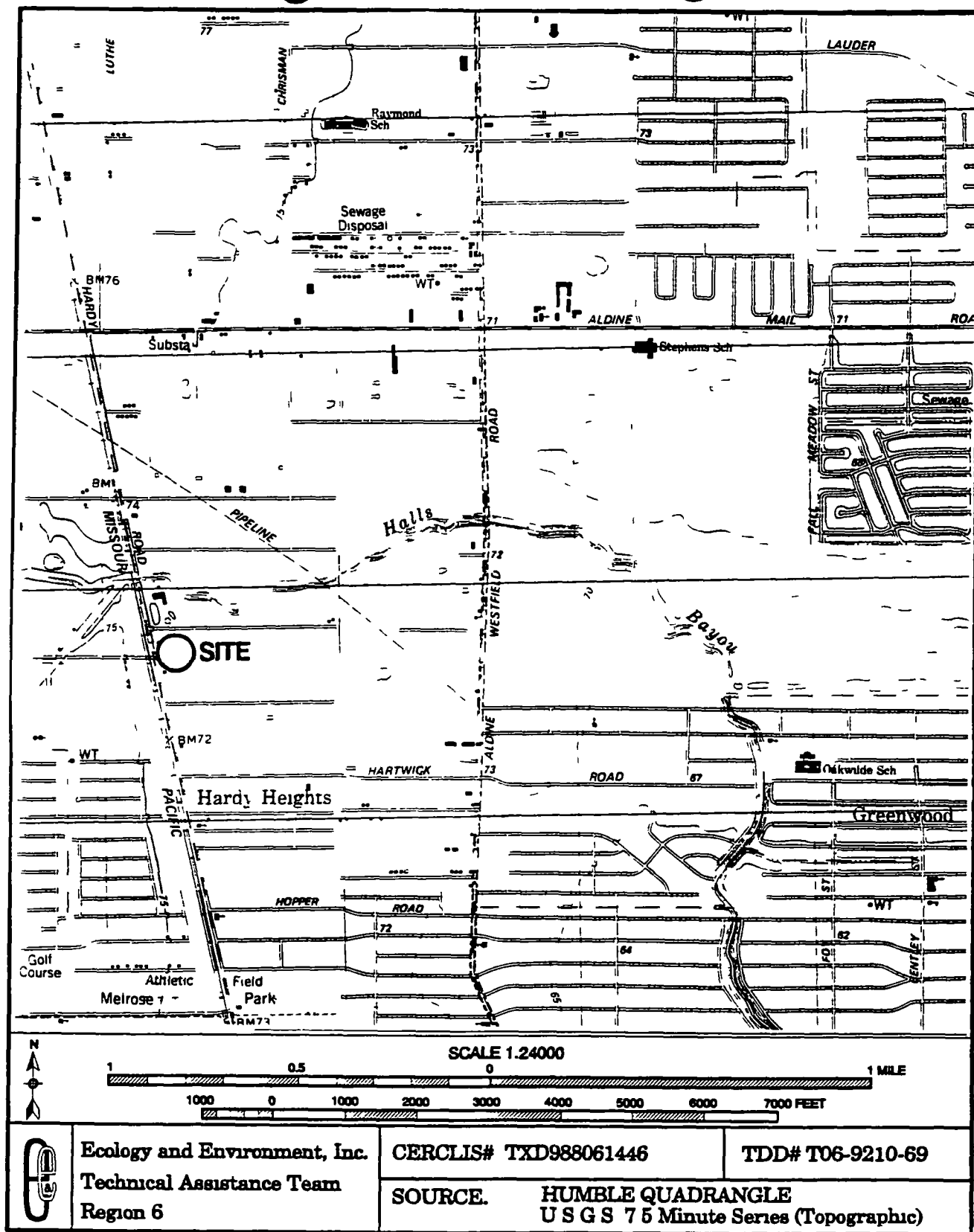
III. LIST OF DELIVERABLES IN SITE FILE

Organization of the EPA Site File is documented in the Site File Organization Index. Elements of the Site File are only referenced in this report and have been placed in the Site File.

ATTACHMENTS

- A. Site Location Map
- B. Site Sketch
- C. Draft After Action Report
- D. Photographs (50 pages)
- E. Unused Photographs
- F. Negatives (TAT file only)
- G. Quality Assurance Sampling Plan
- H. Analytical Data Validation Report
- I. Analytical Data Summary
- J. Analytical Data Package (Included under separate cover)
- K. Records of Communication (6 pages)
- L. POLREPs (1-9 and Final)
- M. Copies of Logbooks (1, 2 and 3)
- N. Site File Organization and Index Sheet
- O. Copy of TDD# T06-9210-69 and Amendments A, B and C

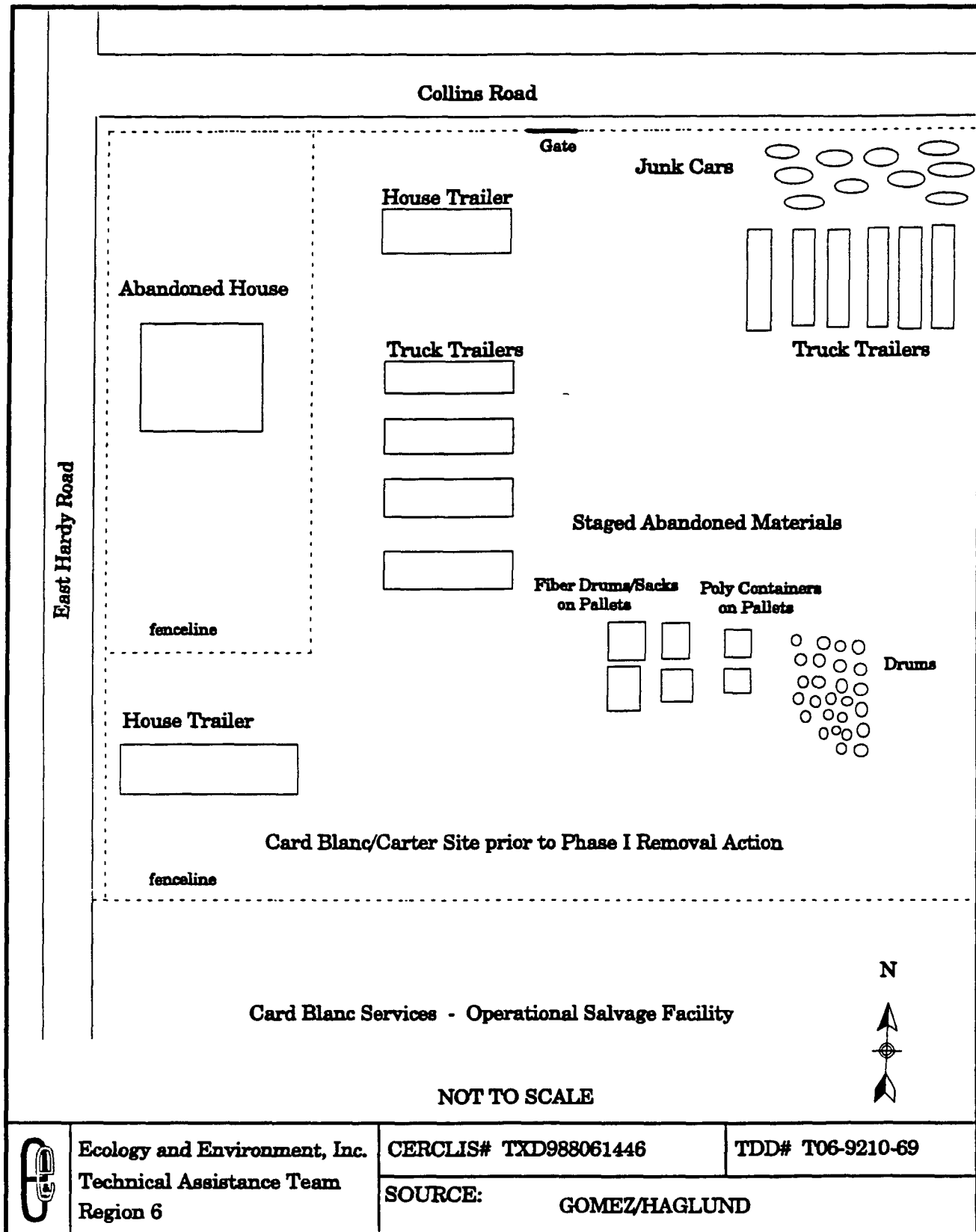
ATTACHMENT - A
SITE LOCATION MAP



ATTACHMENT A - SITE LOCATION MAP
CARD BLANC/CARTER SITE
HOUSTON, HARRIS COUNTY, TEXAS

ATTACHMENT - B

SITE SKETCH



ATTACHMENT B - SITE SKETCH
CARD BLANC/CARTER SITE
HOUSTON, HARRIS COUNTY, TEXAS

ATTACHMENT - C

DRAFT AFTER ACTION REPORT

I Summary of Events

DRAFT

A. Site Conditions and Background

1 Initial Situation

The Card Blanc/Carter site is undeveloped private land, currently owned by Ms Estelle Carter, on which drums, containers and sacks of chemicals and materials intended for salvage had been stored and subsequently abandoned. These drums, containers and sacks had been previously stored at G M I Mann Warehouse, 1120 Lockwood Drive, Houston, Texas. In 1987, Lockwood National Bank of Houston took possession of the materials during debt foreclosure actions.

A Texas Water Commission (TWC) report, dated October 31, 1991, included the following history of the site. On October 23, 1987, the materials were sold at a public auction sponsored by Lockwood National Bank as required by a court order obtained by the bank. The materials were purchased by three persons, Mr Craig McLerran, Mr Charles Pete Miller and Mr Jesse Jackson, representing Page Turbines Incorporated, Houston, Texas, for salvage and resale. The terms of the sale required that the materials be removed from Mann Warehouse by November 10, 1987. When the new owners had not removed the materials by that date, a new agreement was reached in which the deadline was extended to December 30, 1987. The materials were not removed by December 30, 1987 and a monthly rental agreement was reached between Mann Warehouse and the three owners. This rental agreement continued until the materials were removed from the Mann Warehouse facility on May 5, 1988.

On February 1, 1988, a field investigation was conducted by the TWC at Mann Warehouse, at the request of the City of Houston Environmental Department. The TWC documented improper storage of drums and chemicals at Mann Warehouse and issued a Notice of Violation (NOV) letter to the owner, Mr Gene Mann, to properly dispose of the drums and remediate any contaminated soils. Mr Mann responded to the NOV by stating that he did not own the drums, but merely provided rental space for the owners.

On May 5, 1988, the three owners relocated their materials from Mann Warehouse to the Card Blanc/Carter location at 11548 East Hardy Road. Mr Mann notified the TWC of the move and stated that the owners did not appear to be properly managing the materials. The TWC performed a second field investigation at Mann Warehouse and found that almost all the drums and materials had been removed. Mr Miller, one of the three owners of the materials, informed TWC that the materials had been sold for salvage and recycling to a Mexican company.

On March 14, and October 10, 1991, at the request of the Harris County Pollution Control Department, the TWC conducted complaint investigations of abandoned drums at the Card Blanc/Carter site. The TWC investigator met with Mr Ray Dove, owner of Card Blanc Services of America, located at 11532 East Hardy Road. He explained that he had introduced Mr James Moore, representative of the three owners of the salvage materials, to Mr Delbert Riley, the original

owner of the undeveloped property at 11548 East Hardy Road Mr Riley reached an agreement with Mr Moore to allow the owners of the salvage materials to store the materials on his property for one to two days where it would be sorted, repacked and shipped to Mexico After the salvage materials were taken to Mr Riley's property on May 5, 1988, no further action was taken to dispose of them Mr Riley passed away, and the property became the possession of his sister, Ms Carter

The TWC determined that the elderly Ms Carter did not have adequate funds to properly remediate the site, and that she had no involvement in the business transaction agreed to by her brother, Mr Riley

On October 31, 1991, the TWC requested that a state-funded cleanup be conducted at the site TWC referred the site to the U S Environmental Protection Agency Emergency Response Branch (EPA-ERB) when it became apparent that immediate actions might be necessary to control contaminant migration offsite

On December 13, 1991 the Region 6 Technical Assistance Team (TAT) conducted an initial site assessment of the Card Blanc/Carter site TAT observed 116 55-gallon and 85-gallon steel drums in various stages of deterioration allowing spillage of their contents Over 100 5-gallon polyethylene containers and a number of 35-gallon fiberboard drums were staged on pallets Many of the fiber drums were wet and rapidly deteriorating Numerous 40 to 60-pound sacks of materials on deteriorating pallets were noted

A comprehensive sampling assessment was conducted by TAT on January 2-3, 1992 (TDD# T06-9112-005A) Field hazard categorization detected flammable and corrosive liquids TAT collected six liquid and four soil samples, which were analyzed by PDP Analytical Services, Spring, Texas for volatile organics, semi-volatile organics, pesticides, PCBs, and Target Compound List metals Methylene chloride, hexane, acetone, toluene, ethylbenzene and xylene were among the volatile analytes detected Semi-volatile compounds detected included phenanthrene and phenol Pesticide compounds detected included 4,4-dichlorodiphenyltrichloroethane (DDT), aldrin, lindane and chlordane in three of the four soil samples

On October 14, 1992, the EPA initiated a removal action under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments Reauthorization Act of 1986 (SARA)

2 Location of Hazardous Substances

The Card Blanc/Carter site is located on a 1.9-acre facility at 11548 East Hardy Road, Houston, Harris County, Texas The site is bound to the south by Card Blanc Services of America, Inc, an industrial equipment salvage company, to the west by an abandoned house owned by Ms Carter, to the east by residential neighborhood, and to the north by Collins Road The south boundary was originally not fenced and access was easily obtained from the Card Blanc facility

The contaminants at the site had been listed in an inventory conducted prior to the public auction of the materials. Some of the materials itemized in the inventory included paraformaldehyde, benzene, barium chloride crystals, and aqua ammonia.

Analytical results from the site assessment conducted by TAT indicated the presence of methylene chloride, xylene, acetone, toluene, ethylbenzene, benzene, hexane, alkylbenzene, acetic acid, hydrocarbons, phenanthrene, and phenols. All of the wastes listed exhibit characteristics of waste regulated by the Resource Conservation and Recovery Act (RCRA).

Materials on-site were staged outside in a central location on the property. Fiber drums and sacked materials were staged on pallets and stacked two to three pallets high. Small polyethylene containers were staged on pallets. Fifty-five-gallon steel drums were staged nearby. Although the pallets were covered with plastic sheeting, most of the fiber drums and sacked materials were in advanced stages of deterioration and presented a strong potential for release.

3 Cause of the Release or Discharge

Due to severe deterioration of some of the fiber drums, sacked materials and some of the steel drums and containers, contaminants leaked onto the ground. During heavy rains, contaminant pathways from the site onto the Card Blanc Services facility and into storm sewers on Collins Road were observed.

4 Efforts to Obtain Response by Responsible Parties

B Organization of the Response

The EPA and its contractors, the Emergency Response Cleanup Services Contract (ERCS) and TAT conducted a removal action at the Card Blanc/Carter site. The removal action was conducted under the authority of CERCLA as amended by SARA.

C Injury/Possible Injury to Natural Resources

1 Content and Time of Notice to Natural Resource Trustees

2 Trustee Damage Assessment and Restoration Activities

Although stressed and killed vegetation were observed by the TWC during its field investigation, no natural resource damage was reported.

D Chronological Narrative of Response Actions

1 Threat abatement actions taken

On August 25, 1992, Mike Williams, the EPA On-scene Coordinator (OSC) mobilized the ERCS to conduct a removal action at the Card

Blanc/Carter site On that date, ERCS arrived at the site to cover the deteriorating drums and containers with plastic sheeting as a preventive measure in the event Hurricane Andrew made landfall in the Houston area

Phase I of the removal action took place from October 6, 1992 through November 20, 1992 OSC Williams activated TAT and ERCS to stage, sample and categorize drums, containers and sacked materials using hazard categorization techniques The ERCS contractor arrived at the scene on October 6, 1992 and began site preparation activities, including setting up a command post

Materials staging began on October 15, 1992 Sampling began on October 26, and hazard categorization began on October 27, 1992 An inventory of the materials contained in the drums, containers and sacks was prepared based on the hazard categorization data and label information Materials were compatibility tested and composited into waste streams Composite samples were sent to NDRC Laboratories, Houston, Texas for profiling and disposal analyses Materials were separated into the following seven composite waste streams

- Group C1 - Flammable Solids
- Group C2 - Non-characteristic Solids
- Group C3 - Non-characteristic Liquids
- Group C4 - Corrosive Acids
- Group C5 - Basic Solids
- Group C6 - Flammable Liquids
- Group C7 - Oxidizing Solids

A level two Quality Assurance Sampling Plan (QASP) was developed and implemented according to EPA policy and OSWER Directive 9360 4-01 The plan addressed the collection of on-site soil samples in an area where solid materials had been spilled when deteriorated sacks broke open during staging operations On November 6, 1992, TAT collected five composite soil samples, three from a grid where contaminated soil had been scraped up and two from the soil pile resulting from the surface soil scraping The samples were sent to PDP Analytical Services, Spring, Texas, for analysis of PCB's, pesticides, semi-volatiles, volatile organics, metals and total cyanide OSC Williams examined the results and determined that no additional soil removal was necessary

ERCS and TAT partially demobilized from the site on November 7, 1992 to allow the ERCS crew to complete final disposal of materials on another site ERCS and TAT returned to the Card/Blanc Carter site on November 16, 1992 and on November 20, 1992 TAT and ERCS again demobilized, concluding Phase I of the removal action

During the interim period between removal phases I and II, samples of each composite group were analyzed ERCS obtained bids on the disposal of drummed materials from several disposal facilities Two facilities were chosen Laidlaw Environmental Services for disposal of all drummed materials and Western Waste for disposal of roll-off boxes containing soil, personal protective equipment (PPE) waste and site debris

Phase II of the removal action began on March 29, 1993 and concluded on April 13, 1993. EPA OSC Warren Zehner activated the TAT and ERCS contractors to proceed with the final disposal of all on-site hazardous materials. ERCS arrived at the site on March 29, 1993, set up the command post and commenced operations.

Contents of the fiber drums, sacks and small containers were transferred to reconditioned or new 55-gallon drums. Those steel 55-gallon drums that suffered further deterioration since Phase I activities were overpacked into 85-gallon salvage drums. ERCS collected a composite sample of the soil, PPE waste and debris in the roll-off boxes and sent it to NDRC Laboratories, Houston, Texas for TCLP analysis for PCBs and pesticides, volatile organics, semi-volatile organics, and metals. The analytical results were below detection limits for all tests performed except for barium and lead, which were slightly above detection limits at 0.7 mg/l and 0.030 mg/l respectively.

Once the drums were staged and schedules with disposal facilities were finalized, the following shipments took place:

Shipments to TES-Laidlaw, Houston, Texas

April 8	Non-Regulated Material, Non-Hazardous Solid	149 drums
April 9	RQ Waste Flammable Liquids, n o s	49 drums
	RQ Waste Oxidizing Substances, Solid, n o s	1 drum
	Non-Regulated Material, Non-Hazardous Liquid	44 drums
	RQ Corrosive Solid, n o s	3 drums
	Non-Regulated Material, Non-Hazardous Solid	1 drum
	RQ Waste Flammable Solids	10 drums
	RQ Waste Corrosive Liquids, n o s	31 drums

A total of 288 drums were sent to TES-Laidlaw.

Final demobilization occurred on April 9, 1993. TAT and an ERCS chemist were present on-site on April 12 and April 13, 1993, when Coastal Contractors, Inc. transportation company arrived to transport roll-off boxes to the Western Waste non-hazardous Type II landfill in Conroe, Texas.

Shipments to Western Waste, Conroe, Texas

April 12	Two 25-cubic-yard roll-off boxes containing non-hazardous soil, trash and debris
April 13	Two 25-cubic-yard roll-off boxes containing non-hazardous soil, trash and debris

A total of four 25-cubic-yard roll-off boxes were sent to Western Waste.

**2 Treatment/Disposal/Alternative Technology
Approaches Pursued and Followed**

**3 Public Information and Community Relation
Activities Taken**

E Resources Committed

II. Effectiveness of Removal Action

A. Actions taken by PRP's

B Action taken by State and Local Forces

**C Actions taken by Contractors, Private Groups, and
Volunteers**

III Difficulties Encountered

A Items that Affected the Response

B Issues of Integovernmental Coordination

**C Difficulties Interpreting, Complying With, or Implementing
Policies and Regulations**

IV. Recommendations

ATTACHMENT H
ANALYTICAL DATA VALIDATION REPORT

DATA VALIDATION REPORT

DATE December 1, 1992

SITE NAME Card Blanc Site
AND LOCATION Houston, Harris County, TX

REF Project TDD T06-9210-069
Project PAN ETX1325FAA
Analytical PAN ETX1325ABA

PROJECT MANAGER Mariano Gomez, E & E, Houston, TX

DATA REVIEWER Megan Fedders, E & E, Houston TX

LABORATORY PDP Analytical, Spring, TX

ANALYSIS Volatile Organics, Semivolatile Organics,
Pesticides/PCBs, Total Metals, Total Cyanide

MATRIX Soil

SAMPLE LIST A1 A2 A3 P1 P2

OVERALL ASSESSMENT OF DATA FOR USE

The overall usefulness of the data is based on the criteria outlined in the OSWER Directive 9360 4-01, "Quality Assurance/Quality Control Guidance for Removal Activities" (April 1990)

Based upon the information provided, the data are considered acceptable to use at QA Level 2 with the below stated data qualifications

DATA QUALIFICATIONS

VOLATILE ORGANIC COMPOUNDS

I Sample Holding Time Good

All sample holding times were met (14 days before extraction for VOAs in soil)

II GC/MS Tuning Good

All tuning check compound mass abundances and ratios were within contract-required limits for volatile analysis

III Calibration

A Initial Calibration Good

All volatile Target Compound List (TCL) compounds were within contract-required limits for the initial calibrations with average

Relative Response Factors (RRFs) above 0.05 and Percent Relative Standard Deviations (%RSDs) at or below 30 percent

B Continuing Calibration Acceptable

All TCL compounds were at or above the contract-required RRF criteria of 0.05 for volatiles. Most volatile TCL compounds had Relative Percent Difference (RPD) values at or below the required 25 percent. Those compounds whose RPDs exceeded 25% and were detected in an associated sample are listed below.

Compound	Calibration Date	RPD	Associated Samples
Acetone	11/09/92	31.07%	A1, P1, P2
2-Butanone	11/09/92	59.94%	A1, P1, P2
Acetone	11/15/92	55.04%	A2, A3
2-Butanone	11/15/92	62.41%	A2, A3

Detectable concentrations of these compounds in associated samples were flagged as estimated.

IV Method Blank Acceptable

No TCL compounds were detected in any blanks except methylene chloride in the blanks run on 11/09/92 and 11/13/92 and acetone in the blank of 11/09/92. Any positive methylene chloride or acetone result was flagged as undetected if the concentration was below ten times that of the associated blank since these are common laboratory contaminants.

V Surrogate Recoveries Good

Percent recoveries (%Rs) for all surrogate compounds for volatile analysis met QC criteria in all samples, using the data for A2RE and A3RE for samples A2 and A3.

VI Matrix Spike/Matrix Spike Duplicate Acceptable

Most Matrix Spike (MS) and Matrix Spike Duplicate (MSD) percent recoveries for volatile analysis met QC guidelines. The only recovery outside of control limits was for toluene which was unimportant because the sample had a toluene concentration equal to more than four times the spike added. All Relative Percent Difference (RPD) values between the two recoveries met QC guidelines.

VII Duplicate Analysis Not required

No duplicate analysis was run for this group of samples.

VIII Internal Standards Good

All internal standard areas met QC criteria for volatile analysis. All internal standard retention times were within 30 seconds of the retention time of the associated calibrated standard.

IX TCL Compound Identification Good

A review of 10% of the data indicated that the retention times and peak area of the positive results have reasonable agreement with the standards. Mass spectra also have reasonable agreement with mass spectra generated from the library search.

X Compound Quantitation and Reported Detection Limits Good

A review of 10% of the data verified the accuracy of the quantitation calculations. The reported detection limits reflect concentrations, dilutions, sample weights, etc.

XI Tentatively Identified Compounds Good

All TICs have a corresponding library search and appear to be properly identified.

SEMIVOLATILE ORGANIC COMPOUNDS

I Sample Holding Time Good

All sample holding times were met (14 days to extract for semivolatiles in soil).

II GC/MS Tuning Good

All tuning check compound mass abundances and ratios were within contract-required limits for semi-volatile analysis.

III Calibration

A Initial Calibration Good

All semi-volatile Target Compound List (TCL) compounds were within contract-required limits for the initial calibrations with average Relative Response Factors (RRFs) above 0.05 and Percent Relative Standard Deviations (%RSDs) at or below 30 percent.

B Continuing Calibration Acceptable

All TCL compounds were at or above the contract-required RRF criteria of 0.05 for semi-volatiles. Most semi-volatile TCL compounds had Relative Percent Difference (RPD) values at or below the required 25 percent. Those compounds whose RPDs exceeded 25% and were detected in an associated sample are listed below.

Compound	Calibration Date	RPD	Associated Samples
Benzo-(k)-Fluoranthene	11/12/92	28 64%	A2DLRE
Di-n-butylphthalate	11/13/92	39 19%	P2

Detectable concentrations of these compounds in associated samples were flagged as estimated

IV Method Blank Acceptable

No TCL compounds were detected in any blanks except Di-N-Butylphthalate in the blank extracted on 11/09/92 and Bis(2-ethylhexyl)phthalate in those extracted on 11/09/92 and 11/13/92. Any positive result for these compounds was flagged as undetected if the concentration was below ten times that of the associated blank since they are common laboratory contaminants.

V Surrogate Recoveries Acceptable

Percent recoveries (%Rs) for several surrogate compounds for semi-volatile analysis failed to meet QC criteria in each sample. Each sample required dilution to be in calibration range for analysis, but the surrogates were diluted out on the reruns. However, since the internal standards were acceptable for most cases on the diluted rerun, the sample results were not qualified as a result of surrogate recovery.

VI Matrix Spike/Matrix Spike Duplicate Acceptable

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) of sample A2 was performed twice with poor results. The matrix of the sample caused poor chromatography, resulting in the absence of Pentachlorophenol from the MS/MSD samples and the erratic recoveries of the other spike compounds. No action was taken by the reviewer as a result of these recoveries.

VII Duplicate Analysis Not required

No duplicate analysis was run for this group of samples.

VIII Internal Standards Acceptable

Most samples had at least one internal standard area outside of control limits on the initial runs. All internal standard areas on diluted or reanalyzed samples from which data were taken met QC criteria for semi-volatile analysis except for those on sample P2. All internal standard retention times were within 30 seconds of the retention time of the associated calibrated standard except for the last four IS compounds on sample P2. All compounds with detectable concentrations calculated using these internal standards were flagged as estimated.

IX TCL Compound Identification Good

A review of 10% of the data indicated that the retention times and peak area of the positive results have reasonable agreement with the standards. Mass spectra also have reasonable agreement with mass spectra generated from the library search.

X Compound Quantitation and Reported Detection Limits Good

A review of 10% of the data verified the accuracy of the quantitation calculations. The reported detection limits reflect concentrations, dilutions, sample weights, etc.

XI Tentatively Identified Compounds Good

All TICs have a corresponding library search and appear to be properly identified.

PESTICIDES & PCBs

I Sample Holding Time Good

All sample holding times were met.

II Instrument Performance Check

A DDT Retention Time and Resolution Check Good

The retention time for DDT is greater than 12 minutes on the standard chromatogram. A Resolution Check Mixture was run at the beginning of the initial calibration for each column and met QC requirements for resolution.

B Retention Times Good

All retention time windows were reported and the standards fell within those windows.

C Performance Evaluation Mixture Good

The PEM was run as needed and met QC requirements for resolution, retention time and percent recovery for both surrogates and target compounds. The individual percent breakdowns of 4,4'-DDT and Endrin were acceptable for runs associated with the samples.

III Calibration

A Initial Calibration Good

Individual Standard Mixtures (ISMs) A and B were analyzed for the proper concentrations and met QC requirements for resolution, retention time, deflections, and percent relative standard deviation (%RSD). Multi-component Target Compound analyses met required.

control limits for retention time and calibration factor determination

B Continuing Calibration Good

Blanks, PEMs, and ISMs were run at the required intervals and met QC criteria for resolution and retention times All target compounds in the PEM had Relative Percent Difference (RPD) values at or below the required 25 percent

IV Method Blank Good

No target compounds were detected in any blanks

V Surrogate Recoveries Acceptable

The pesticide/PCB extracts required dilution for each sample, causing the surrogates to be diluted out in most cases When recovery was achieved, the results were acceptable No action was taken as a result of these recoveries

VI Matrix Spike/Matrix Spike Duplicate

All MS/MSD percent recoveries were within the suggested control limits of 80-120% except for Heptachlor and Endrin in the MS and Aldrin, Endrin, Dieldrin, and 4,4'-DDT for the MSD Since these sample extracts required dilution and matrix effects were observed, no action was taken on the basis of these recoveries

VII Target Compound Identification Good

A review of 10% of the data indicated that the retention times and peak area of the positive results have been transcribed properly For multi-component target compounds, reasonable agreement of relative peak heights and retention times with the standards has been achieved

VIII Sample Results Verification Good

A review of 10% of the data verified the accuracy of the quantitation calculations The reported detection limits reflect concentrations, dilutions, sample weights, etc

IX Compound Quantitation and Reported CRQLS Good

A review of 10% of the data verified the accuracy of the quantitation calculations The reported detection limits reflect concentrations, dilutions, sample weights, etc When the two columns showed different concentrations of a compound, the possibility of coelution was examined and taken into consideration when choosing the value reported

INORGANIC ANALYTES

I Sample Holding Time Good

All sample holding times were met

II Calibration

A Initial Calibration Good

The percent recovery values for the initial calibration for all analytes fell within the 90-110% control limit

B Continuing Calibration Good

The percent recovery values for all analytes in each continuing calibration check fell within the 90-110% control limit

III Method Blank Good

No analytes were detected in laboratory blanks at levels above Instrument Detection Limits (IDL)

IV ICP Interference Check Sample Not required

ICS data was not submitted by the laboratory

V Laboratory Control Sample Good

The percent recoveries for all laboratory control sample results were between 80-120% for all analytes

VI Duplicate Analysis Acceptable

Relative Percent Difference (RPD) values for the duplicate of sample A2 met the suggested limit of 35% except for Copper No action was taken as a result of this value

VII Matrix Spike Acceptable

All MS percent recoveries fell within the suggested limits of 75-125% except for Antimony, Copper, and Thallium No MSD was performed No action was taken as a result of these recoveries

VIII ICP Serial Dilution Not required

An ICP serial dilution was not performed for this group of samples

IX Sample Results Verification Good

A review of 10% of the data verified the accuracy of the quantitation calculations The reported detection limits reflect concentrations, dilutions, sample weights, etc

DATA QUALIFIERS AND DEFINITIONS

- U - The material was analyzed for, but not detected
- UJ - The material was analyzed for but not detected The reported detection limit is estimated because quality control criteria were not met
- J - The associated numerical value is an estimated quantity because the reported concentrations were less than the required detection limits or quality control criteria were not met
- R - The data are rejected The compound may or may not be present

ATTACHMENT - I
ANALYTICAL DATA SUMMARY

ORGANIC DATA RESULTS FOR CARD BLANC SITE SOIL SAMPLES

ANALYSIS	SAMPLE ID				
VOLATILE ORGANICS (MG/KG)	A-1	A-2	A-3	P-1	P-2
METHYLENE CHLORIDE	0 27	0 28	0 52	0 14	0 07
ACETONE		0 05J	0 14J	1 2J	0 84J
CARBON DISULFIDE					0 02J
1,1-DICHLOROETHANE				0 04	
1,2-DICHLOROETHANE				0 03	
2-BUTANONE (MEK)			0 02J	0 20J	
1,1,1-TRICHLOROETHANE				0 03J	
1,2-DICHLOROPROPANE				0 04J	
TRICHLOROETHENE				0 03J	0 01J
1,1,2-TRICHLOROETHANE				0 03J	
BENZENE		0 01J		0 01J	0 06
TOLUENE	0 55	0 14	0 06	5 5J	1 7J
ETHYLBENZENE	0 26	0 10	0 01J	1 7J	0 84
XYLENE (TOTAL)	0 46	0 26	0 02J	3 4J	1 9J
TENTATIVELY IDENTIFIED COMPOUNDS					
UNKNOWN HYDROCARBONS (*)	0 19J	12J	0 08J	0 90J	13J
UNKNOWNNS (*)	0 30J	6 7J		3 3J	12J
SUBSTITUTED AROMATIC (*)	0 13J	4 5J		1 9J	0 02J
SUBSTITUTED NAPHTHALENE	0 11J				
SUBSTITUTED ACETIC ACID			0 052J		

J - INDICATES ESTIMATED VALUE BASED ON ANALYTICAL QA/QC PROTOCOLS

ALL BLANKS SHOULD BE CONSIDERED NON-DETECTABLE CONCENTRATIONS

TENTATIVELY IDENTIFIED COMPOUNDS ARE THOSE COMPOUNDS WHICH ARE NOT ON THE TARGET COMPOUND LIST FOR THAT SPECIFIC ANALYSIS

* - INDICATES SUMMATION OF ALL REPORTED UNKNOWNNS FOR EACH CLASS OF COMPOUNDS

ORGANIC DATA RESULTS FOR CARD BLANC SITE SOIL SAMPLES

ANALYSIS SEMI-VOLATILES (MG/KG)	A-1	A-2	SAMPLE ID A-3	P-1	P-2
NAPTHALENE	1 1	0 76			1 0
2-METHYLNAPTHALENE	7 2	3 0		2 8	1 7
ACENAPTHENE	1 3	0 74		1 6	
FLUORENE	1 4	0 87		2 7	
PHENANTHRENE	2 1	0 50	0 47	1 5	0 76J
ANTHRACENE	6 1	3 0		11	1 1J
D1-n-BUTYLPHTHALATE	1 0	9 2	46J	4 3	3 2J
FLUORANTHENE	0 44	1 2		0 98	
PYRENE	0 73	1 8	0 38J	1 3	
BUTYLBENZYLPHTHALATE	0 81	5 1	35J	2 1	1 5J
BENZO-(a)-ANTHRACENE		0 98			
CHRYSENE		1 6			
bis(2-ETHYLHEXYL) PHTHALATE		1 7	1 7	2 0	0 87J
Di-n-OCTYLPHTHALATE					0 95J
BENZO-(b)-FLUORANTHENE		1 0J			
BENZO-(k)-FLUORANTHENE		0 64J			
BENZO-(a)-PYRENE		0 59			
IDENO-(1,2,3-c,d) PYRENE		0 41			
TENTATIVELY IDENTIFIED COMPOUNDS					
UNKNOWN AROMATICS (*)	23J	17J		8 4J	0 24J
UNKNOWN HYDROCARBONS (*)		234J	11J		5 3J
UNKNOWNNS (*)	18J	15J	66J	31J	1 2J

J - INDICATES ESTIMATED VALUE BASED ON ANALYTICAL QA/QC PROTOCOLS

ALL BLANKS SHOULD BE CONSIDERED NON-DETECTABLE CONCENTRATIONS

TENTATIVELY IDENTIFIED COMPOUNDS ARE THOSE COMPOUNDS WHICH ARE NOT ON THE TARGET COMPOUND LIST FOR THAT SPECIFIC ANALYSIS

* - INDICATES SUMMATION OF ALL REPORTED UNKNOWNNS FOR EACH CLASS OF COMPOUNDS

ORGANIC DATA RESULTS FOR CARD BLANC SITE SOIL SAMPLES

ANALYSIS PESTICIDE/PCB (MG/KG)	A-1	A-2	SAMPLE ID A-3	P-1	P-2
ALDRIN				0 15J	
ENDRIN	0 18J	0 03J	0 28J	1 8J	
ENDRIN ALDEHYDE	0 15J	0 45J			
alpha-CHLORDANE	0 07J			0 58J	
gamma-CHLORDANE	0 34J				

J - INDICATES ESTIMATED VALUE BASED ON ANALYTICAL QA/QC PROTOCOLS

ALL BLANKS SHOULD BE CONSIDERED NON-DETECTABLE CONCENTRATIONS

TENTATIVELY IDENTIFIED COMPOUNDS ARE THOSE COMPOUNDS WHICH ARE NOT
ON THE TARGET COMPOUND LIST FOR THAT SPECIFIC ANALYSIS

* - INDICATES SUMMATION OF ALL REPORTED UNKNOWNNS FOR EACH CLASS OF COMPOUNDS

INORGANIC DATA RESULTS FOR CARD BLANC SITE SOIL SAMPLES

ANALYSIS INORGANICS (MG/KG)	A-1	A-2	SAMPLE ID A-3	P-1	P-2
TOTAL CYANIDE			1 4		
ALUMINUM	1000	12,000	7400	5700	11,000
ANTIMONY					
ARSENIC	4 9	3 6	2 2	3 3	3 9
BARIUM	310	380	210	290	300
BERYLLIUM	0 6	0 07		0 5	0 7
CADMIUM	1 8	0 8		0 7	0 6
CALCIUM	41,000	62,000	43,000	48,000	47,000
CHROMIUM	28	29	17	210	39
COBALT	9	9	5	93	9
COPPER	68	44	50	44	43
IRON	18,000	14,000	9300	17,000	11,000
LEAD	100	52	110	140	49
MAGNESIUM	2800	3800	2800	2600	3300
MANGANESE	360	2800	210	450	510
MERCURY					
NICKEL	16	16	10	17	15
POTASSIUM	1300	1700	1300	800	1600
SELENIUM					
SILVER					
SODIUM	850	1500	8600	5300	3600
THALLIUM					
VANADIUM	20	22	15	14	17
ZINC	11	83	78	82	73

ALL BLANKS SHOULD BE CONSIDERED NON-DETECTABLE CONCENTRATIONS

ATTACHMENT - L
POLREPs (1-9 and FINAL)

Date October 20 1992

From Mike Williams OSC
To Director ERD and Region 6
Subject Card Blanc/Carter Site Houston Harris County Texas
POLREP POLREP ONE

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 10/06/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved by HQ on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road Houston Harris County Texas was originally reported to the Harris County Pollution Control Department (HPCPD) in February 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the site HPCPD referred the site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a site visit and prepared a report requesting that a state funded cleanup be conducted at the site TWC referred the site to the U S Environmental Protection Agency (EPA) Emergency Response Branch (ERB) when it became apparent that immediate action might be necessary to control contaminant migration off-site According to the TWC report the materials were originally part of a shipment which was to be salvaged

On January 1992 the Technical Assistance Team (TAT) conducted a site assessment at CBS The TAT noticed that the containers with materials being stored at the site were in advanced stages of deterioration The TAT took drum and soil samples in order to characterize the site A second site assessment took place on September 1992 when off-site samples were taken to evaluate possible contamination migration

Status of Actions

On October 6 1992 EPA-OSC Mike Williams mobilized the TAT and the Emergency Response Contractor Services (ERCS) to conduct a removal action at the CBS site. Even though, some ERCS personnel mobilized to the Houston area to prepare the site on October 7 1992 actual work did not begin until October 14 1992. During the period from October 14 to October 19, 1992 ERCS has staged twenty eight (28) fifty-five-gallon drums eight (8) eighty-five-gallon overpacks fifty (50) - sixty (60) five-gallon buckets ten (10) one-ounce bottles, six (6) fiberboard drums, and two-hundred (200) to three-hundred (300) sacks of solid material to include among others, paraformaldehyde and graphite. Some of the containers were in such an advanced stage of deterioration that had to be overpacked. These drums were staged in new pallets since the original ones were severely deteriorated. The bags of sacked materials were also so deteriorated that it was almost impossible to move and stage them. The TAT has provided air monitoring support as well as performed all necessary administrative activities. Excellent weather conditions have favored the steady progress of the staging operation.

Next Steps

The remaining drums and containers are presently being relocated and staged. The pallets with the containers will be wrapped to avoid further deterioration and spillage.

Once all the materials have been staged they will be sampled and categorized using field hazard categorization (HAZCAT) techniques. The HAZCAT results will provide relevant information in order to combine transfer, and bulk compatible materials for their disposal. Compatible samples will be composited and analyzed in order to obtain waste stream profiles to be used for disposal purposes. Finally the disposal facilities will make bids and one will be selected.

Key Issues

The work pace has slowed down to take extreme safety measures when moving and staging the more deteriorated drums and sacks.

COST INFORMATION

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$300 000	Pending	
EPA/TAT	\$200 000	Pending	
Intramural			
Contingency			
=====			
TOTAL	\$500 000		

TAT Representative Mariano Gomez

Case Pends

Date October 26, 1992

From Mike Williams, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP ONE-A (Supplemental)

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved by HQ on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HCPCD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the site HCPCD referred the site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a site visit and prepared a report requesting that a state funded cleanup be conducted at the site TWC referred the site to the U S Environmental Protection Agency (EPA) Emergency Response Branch (ERB) when it became apparent that immediate action might be necessary to control contaminant migration off-site According to the TWC report, the materials were originally part of a shipment which was to be salvaged

On January 1992, the Technical Assistance Team (TAT) conducted a site assessment at CBS The TAT noticed that the containers with materials being stored at the site were in advanced stages of deterioration The TAT took drum and soil samples in order to characterize the site A second site assessment took place on September 1992, when off-site samples were taken to evaluate possible contamination migration

Status of Actions

On August 25, 1992 EPA-OSC Mike Williams mobilized the Emergency Response Contractor Services (ERCS) to conduct a removal action at the CBS site On that date, ERCS arrived at the site in order to cover the deteriorating drums and containers This action was initiated under the OSC s fifty thousand dollar (\$50,000) authority as a preventive measure in case Hurricane Andrew made landfall in the Houston area The removal activities (staging, sampling, sample categorization (HAZCAT), bulking, overpacking etc) began on October 6, 1992 The activities from October 6, 1992 to October 20, 1992 are included in Polrep One

Next Steps

The remaining drums and containers are presently being relocated and staged. The pallets with the containers will be wrapped to avoid further deterioration and spillage. In the process of staging the drums and containers, spillage of the materials in some of the containers has been unavoidable.

Once all the materials have been staged, they will be sampled and categorized using field hazard categorization (HAZCAT) techniques. The HAZCAT results will provide relevant information in order to combine, transfer and bulk compatible materials for their disposal. Compatible samples will be composited and analyzed in order to obtain waste stream profiles to be used for disposal purposes. Finally, bids will be solicited and received from EPA/Resource Conservation and Recovery Act (RCRA) approved disposal facilities.

COST INFORMATION

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$300,000	Pending	
EPA/TAT	\$200,000	Pending	
Intramural			
Contingency			

TOTAL	\$500,000		

TAT Representative Mariano Gomez

Case Pends

Date October 27, 1992

From Mike Williams, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP TWO

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved by HQ on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HPCPD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the site HPCPD referred the site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a site visit and prepared a report requesting that a state funded cleanup be conducted at the site TWC referred the site to the U S Environmental Protection Agency (EPA) Emergency Response Branch (ERB) when it became apparent that immediate action might be necessary to control contaminant migration off-site According to the TWC report, the materials were originally part of a shipment which was to be salvaged

On January 1992, the Technical Assistance Team (TAT) conducted a site assessment at CBS The TAT noticed that the containers with materials being stored at the site were in advanced stages of deterioration The TAT took drum and soil samples in order to characterize the site A second site assessment took place on September 1992, when off-site samples were taken to evaluate possible contamination migration

Status of Actions

During the period from October 19 to October 26, 1992, ERCS has staged, approximately

- forty seven (47) fifty-five-gallon steel drums
- nine (9) eighty-five-gallon steel drums

- two hundred and fourteen (214) five-gallon containers
- thirty-five (35) fiber drums of diverse volumes
- thirteen (13) one-gallon containers
- five (5) ten-gallon containers
- three (3) thirty-five-gallon containers
- four hundred and thirteen (413) sacks containing diverse chemicals
- nine (9) pallets of sacked material in poor condition

All of the drums and containers in fair enough condition to be moved, have been staged Only a few, extremely decomposed sacks remain

Sampling operations began on October 26, 1992 At the end of the day, twenty-six (26) samples had been taken Field Hazard Categorization (HAZCAT) of these samples has not started

Next Steps

In the process of staging the drums and containers, spillage of the materials from some of the containers have been unavoidable These decomposed containers are being picked-up with a front end loader (Bobcat) and wrapped in plastic sheeting

Once all the materials have been staged, the materials will be sampled and categorized using field hazard categorization (HAZCAT) techniques The HAZCAT results will provide relevant information in order to combine, transfer, and bulk compatible materials for their disposal Compatible samples will be composited and analyzed in order to obtain waste stream profiles to be used for disposal purposes Finally, bids will be solicited and received from EPA/Resource Conservation and Recovery Act (RCRA) approved disposal facilities

COST INFORMATION - as of October 26, 1992

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$300,000	\$60,285 90	\$249,714 10
EPA/TAT	\$200,000	Pending	
Intramural			
Contingency			

TOTAL	\$500,000	\$60,285 90	\$249,714 10

TAT Representative Mariano Gomez

Case Pends

Date November 3, 1992

From Mike Williams, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP THREE

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status: On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved by HQ on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HPCPD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the Site HPCPD referred the Site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a Site visit and prepared a report requesting that a state funded cleanup be conducted at the Site On December 12, 1991, the United State Environmental Protection Agency Emergency Response Branch (EPA/ERB) received a request letter from the TWC to investigate the potential for an emergency removal action at the Site According to the TWC report, the materials at the Site were originally part of a shipment which was to be salvaged

On January 2, 1992, the OSC and Technical Assistance Team (TAT) conducted a site assessment at CBS The TAT noticed that the containers with materials being stored at the site were in advanced stages of deterioration The TAT took drum and soil samples in order to characterize the site A second site assessment took place on September 10, 1992, when off-site samples were taken to evaluate possible contamination migration

Status of Actions

During the period from October 27 to November 2, 1992, ERCS completed staging all drums and containers The following is a summary of the drums and containers that were staged

- one hundred and twelve (112) fifty-five-gallon steel drums
- fifteen (15) eighty-five-gallon steel drums
- two hundred and thirty-eight (238) five-gallon containers
- thirty (30) fiber drums of diverse volumes

- thirteen (13) one-gallon containers
- five (5) ten-gallon containers
- three (3) thirty-five-gallon containers
- thirty two (32) thirty-gallon containers
- ten (10) three gallon containers
- ten (10) one-ounce bottles
- four hundred and thirty eight (438) sacks containing diverse chemicals
- twenty-one (21) pallets of sacked material in poor condition

The decomposed containers were picked-up with a front end loader and wrapped in polyethylene sheeting. In the process of staging the drums and containers, the spillage of some material was unavoidable. However, each individual spill was cleaned-up per instructions from the OSC. The cleaned-up spills were also placed on polyethylene sheeting.

Sampling operations began on October 26, 1992. To date, two-hundred and nine (209) liquid and solid samples have been taken. Field Hazard Categorization (HAZCAT) of these samples has also begun. Presently, ninety-seven (97) samples have been categorized. The resulting primary waste streams are as follows:

- Corrosive Basic Material
- Corrosive Acidic Material
- Flammable Liquids
- Non-Characteristic Solids and Liquids

The hazard categorization (HAZCAT) results will provide relevant information in order to combine, transfer, and bulk compatible materials for disposal once the materials have been sampled and categorized using field HAZCAT techniques. Compatible samples will be composited and analyzed in order to obtain waste stream profiles to be used for disposal purposes. Finally, bids will be solicited and received from EPA/Resource Conservation and Recovery Act (RCRA) approved disposal facilities.

COST INFORMATION - as of October 29, 1992

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$300,000	\$73,154 03	\$226,845 97
EPA/TAT	\$200,000	Pending	
Intramural			
Contingency			
<hr/>			
TOTAL	\$500,000	\$73,154 03	\$226,845 10

TAT Representative Mariano Gomez

Case Pends

Date November 10, 1992

From Mike Williams, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP FOUR

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HCPCD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the Site HCPCD referred the Site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a Site visit and prepared a report requesting that a state funded cleanup be conducted at the Site On December 12, 1991, the United State Environmental Protection Agency Emergency Response Branch (EPA/ERB) received a request letter from the TWC to investigate the potential for an emergency removal action at the Site According to the TWC report, the materials at the Site were originally part of a shipment which was to be salvaged

On January 2, 1992, the OSC and Technical Assistance Team (TAT) conducted a site assessment at CBS The TAT noticed that the containers with materials being stored at the site were in advanced stages of deterioration The TAT took drum and soil samples in order to characterize the site A second site assessment took place on September 10, 1992, when off-site samples were taken to evaluate possible contamination migration

Status of Actions

During the period from November 3 to November 10, 1992, ERCS completed staging all drums and containers

The sampling operations that began on October 26, 1992 have been completed A total of five hundred and three (503) liquid and solid samples were taken Field Hazard Categorization (HAZCAT) of these samples has also been completed

The resulting primary waste streams are as follows

- Corrosive Basic Material
- Corrosive Acidic Material
- Flammable Liquids
- Flammable Solids
- Non-Characteristic Solids and Liquids

It is important to point out that 3 samples gave positive cyanide tests

The hazard categorization (HAZCAT) results will provide relevant information in order to combine, transfer, and bulk compatible materials for disposal once the materials have been sampled and categorized using field HAZCAT techniques. Compatible samples will be composited and analyzed in order to obtain waste stream profiles to be used for disposal purposes. Finally, bids will be solicited and received from EPA/Resource Conservation and Recovery Act (RCRA) approved disposal facilities.

Key Issues

ERCS has demobilized from the Card Blanc/Carter Site for a period of one (1) week in order to complete the final disposal of the materials at the Hillsdale site in Louisiana. OSC Williams deemed this a suitable time for ERCS to proceed with the disposal at Hillsdale since all the staging, sampling and hazcatting has been completed at the Card Blanc/Carter Site, and rescheduling disposal shipments from the Hillsdale Site to the chosen facilities is inappropriate/wasteful.

ERCS is expected back to the Card Blanc/Carter site on November 16, 1992, at which time they will proceed with the overpacking, bulking and final staging (by hazard class) of the on-site materials. Also at that time, compatible samples will be composited and sent to a laboratory in order to obtain waste stream profiles for disposal purposes.

COST INFORMATION - as of October 29 1992

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$300,000	\$73,154 03	\$226,845 97
EPA/TAT	\$200,000	Pending	
Intramural			
Contingency			

TOTAL	\$500,000	\$73,154 03	\$226,845 10

TAT Representative Mariano Gomez

Case Pends

Date November 17, 1992

From Mike Williams, OSC

To Director, ERD and Region 6

Subject Card Blanc/Carter Site, Houston, Harris County, Texas

POLREP POLREP FIVE

Site No 2W

D O No 0035-06-040

Response Authority CERCLA

NPL Status non-NPL

Start Date 08/25/92

Approval Status: On-Scene Coordinator (OSC)

Status of Action Memo Action Memo approved on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HCPCD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the Site HCPCD referred the Site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a Site visit and prepared a report requesting that a state funded cleanup be conducted at the Site On December 12, 1991, the United State Environmental Protection Agency Emergency Response Branch (EPA/ERB) received a request letter from the TWC to investigate the potential for an emergency removal action at the Site According to the TWC report, the materials at the Site were originally part of a shipment which was to be salvaged

On January 2, 1992, the OSC and Technical Assistance Team (TAT) conducted a site assessment at CBS The TAT noticed that the containers with materials being stored at the site were in advanced stages of deterioration The TAT took drum and soil samples in order to characterize the site A second site assessment took place on September 10, 1992, when off-site samples were taken to evaluate possible contamination migration

Status of Actions

During the period from November 10 to November 15, 1992, no work took place at the Card Blanc/Carter Site since ERCS demobilized for a period of one (1) week to complete the final disposal of the materials at the Hillsdale Site in Louisiana OSC Williams deemed this a suitable time for ERCS to proceed with the disposal at Hillsdale since all staging, sampling and hazard categorization had been completed at the Card Blanc/Carter Site, and rescheduling disposal shipments from the Hillsdale Site to the chosen facilities was considered inappropriate/wasteful

ERCS returned to the Card Blanc/Carter site on November 16, 1992, and has begun overpacking, bulking and staging (by hazard class) the on-site materials. Also, compatible samples are in the process of being sorted by hazard class, compatibility tested and composited. These composite samples will then be sent to a laboratory in order to obtain each waste stream profile for disposal purposes.

The resulting waste streams are as follows:

- Basic Liquid (32)
- Basic Solid (7)
- Acid Liquid (32)
- Acid Solid (7)
- Flammable Liquid (59)
- Flammable Solid (44)
- Non-Characteristic Solid (306)
- Non-Characteristic Liquid (62)
- Cyanide Liquid (6)
- Oxidizing Liquid (1)
- Oxidizing Solid (5)
- Sulfide Solid (3)

Key Issues

Phase I Removal operations are expected to conclude by 11/21/92 at which time ERCS and TAT will demobilize to await EPA's Enforcement Branch determination on their search for Potentially Responsible Parties (PRPs).

COST INFORMATION - as of November 16, 1992

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$300,000	\$99,722 64	\$200,277 36
EPA/TAT	\$200,000	Pending	
Intramural			
Contingency			
<hr/>			
TOTAL	\$500,000	\$99,722 64	\$200,277 36

TAT Representative Mariano Gomez

Case Pends

Date November 24, 1992

From Mike Williams, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP SIX

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HCPCD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the Site HCPCD referred the Site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a Site visit and prepared a report requesting that a state funded cleanup be conducted at the Site On December 12, 1991, the United State Environmental Protection Agency Emergency Response Branch (EPA/ERB) received a request letter from the TWC to investigate the potential for an emergency removal action at the Site According to the TWC report, the materials at the Site were originally part of a shipment which was to be salvaged

On January 2, 1992, the OSC and Technical Assistance Team (TAT) conducted a site assessment at CBS The TAT noticed that the containers with materials being stored at the site were in advanced stages of deterioration The TAT took drum and soil samples in order to characterize the site A second site assessment took place on September 10, 1992, when off-site samples were taken to evaluate possible contamination migration

Status of Actions

During the period from November 17 to November 20, 1992, ERCS continued and completed the overpacking of all on-site materials ERCS also completed the sorting, compatibility testing and compositing of samples These composite samples were sent to NDRC laboratories in order to obtain each waste stream s profile for disposal purposes

The resulting waste streams are as follows

- Basic Liquid (32)
- Basic Solid (7)
- Acid Liquid (32)
- Acid Solid (7)
- Flammable Liquid (59)
- Flammable Solid (44)
- Non-Characteristic Solid (306)
- Non-Characteristic Liquid (62)
- Cyanide Liquid (6)
- Oxidizing Liquid (1)
- Oxidizing Solid (5)
- Sulfide Solid (3)

The analytical results of the five five-point-composite soil samples that were taken on November 6, 1992 were delivered by PDP Analytical Services on November 18, 1992. Methylene Chloride, Toluene, Acetone, Ethylbenzene and Xylene were among the volatiles reported. Semi-volatile compounds detected included Di-n-Butylphthalate and Butylbenzylphthalate. Pesticide compounds detected included Aldrin, Endrin, Endrin Aldehyde, Alpha and Gamma - Chlorodane. Among the metals detected were Aluminum, Calcium, Iron, Potassium, and Sodium. A small amount of Cyanide was detected in one of the five samples.

Key Issues

Phase I Removal operations concluded on November 20, 1992 at which time ERCS and TAT demobilized to await EPA's Enforcement Branch determination on their search for Potentially Responsible Parties (PRPs).

Due to a power surge, ERCS has not been able to update cost information.

COST INFORMATION - as of November 16, 1992

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$300,000	\$99,722 64	\$200,277 36
EPA/TAT	\$200,000	Pending	
Intramural			
Contingency			

TOTAL	\$500,000	\$99,722 64	\$200,277 36

TAT Representative Mariano Gomez

Case Pends

Date April 3, 1993

From Warren Zehner, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP SEVEN

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HCPCD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the site HCPCD referred the site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a site visit and prepared a report requesting that a state funded cleanup be conducted at the site On December 12, 1991, the United State Environmental Protection Agency Emergency Response Branch (EPA/ERB) received a request letter from the TWC to investigate the potential for an emergency removal action at the site According to the TWC report, the materials at the site were originally part of a shipment which was to be salvaged

On January 2, 1992, the OSC and Technical Assistance Team (TAT) collected drum and soil samples during a site assessment at CBS and observed containers in advanced stages of deterioration Off-site samples were taken on September 10, 1992 to evaluate possible contamination migration Phase I Removal actions took place from October 6 to November 20, 1992

Status of Actions

During the period from March 29 to April 3, 1993, the OSC mobilized the Emergency Response Cleanup Services (ERCS) to the site to initiate Phase II Removal activities March 29 was involved with site set up, and work activities began on March 30 ERCS staged 85-gallon overpacks according to waste stream and began consolidating compatible wastes from bags and 5-gallon

containers into 55-gallon drums Fiber containers were repacked into overpack drums

The twelve waste streams were consolidated into the following seven composite waste streams

- C1 Flammable Solids
- C2 Non-characteristic Solids
- C3 Non-characteristic Liquids
- C4 Corrosive Acids
- C5 Basic Solids
- C6 Flammable Liquids
- C7 Oxidizing Solids

A composite sample of soil and PPE was taken by ERCS from two roll-off boxes It was picked up NDRC Laboratories on April 2, 1993 for TCLP metals, pesticides/PCB, volatiles and semi-volatiles analysis for the purpose of disposal profiling

COST INFORMATION - as of April 2, 1993

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$500,000	\$210,127 88	\$289,872 12
EPA/TAT		Pending	
Intramural			
Contingency			

TOTAL	\$500,000	\$210 127 88	\$289,872 12

TAT Representative Roberta Haglund

Case Pends

Date April 9, 1993

From Warren Zehner, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP EIGHT

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HCPCD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the site HCPCD referred the site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a site visit and prepared a report requesting that a state funded cleanup be conducted at the site On December 12, 1991, the United State Environmental Protection Agency Emergency Response Branch (EPA/ERB) received a request letter from the TWC to investigate the potential for an emergency removal action at the site According to the TWC report, the materials at the site were originally part of a shipment which was to be salvaged

On January 2, 1992, the OSC and Technical Assistance Team (TAT) collected drum and soil samples during a site assessment at CBS and observed containers in advanced stages of deterioration Off-site samples were taken on September 10, 1992 to evaluate possible contamination migration Phase I Removal actions took place from October 6 to November 20, 1992 Phase II Removal actions began on March 29, 1993

Status of Actions

During the period from April 4 to April 9, 1993, ERCS completed bulking compatible wastes into seven composite waste streams On April 8 and April 9, 1993, Laidlaw Environmental Services accepted for disposal all drummed waste streams Laidlaw performed Quality Control on all drums on-site, labeled them on-site and provided the manifests and landban paperwork

A total of 288 drums were removed in the following hazard classes

Non-regulated Material, Non-hazardous Solid	150
RQ Waste Flammable Liquids	49
Non-regulated Material, Non-hazardous Liquid	44
RQ Waste Corrosive Liquids	31
RQ Waste Flammable Solids	10
RQ Corrosive Solid	3
RQ Waste Oxidizing Substances, Solid	1

TAT and ERCS demobilized from the site on April 9, 1993

Results of the TCLP analyses performed on the soil sample were all clean. The soil, PPE and site debris in four roll-off boxes were left on-site. They are scheduled to be removed by Western Waste on April 12 and April 13, 1993.

COST INFORMATION - as of April 7, 1993

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$500,000	\$233,291 78	\$266,708 22
EPA/TAT		Pending	
Intramural			
Contingency			

TOTAL	\$500,000	\$233,291 78	\$266,708 22

TAT Representative Roberta Haglund

Case Pends

Date April 13, 1993

From Warren Zehner, OSC
To Director, ERD and Region 6
Subject Card Blanc/Carter Site, Houston, Harris County, Texas
POLREP POLREP NINE AND FINAL

Site No 2W
D O No 0035-06-040
Response Authority CERCLA
NPL Status non-NPL
Start Date 08/25/92
Approval Status On-Scene Coordinator (OSC)
Status of Action Memo Action Memo approved on 09/30/92

Type of Incident Time Critical Removal

Situation

The Card Blanc Salvage (CBS) site located at 11548 East Hardy Road, Houston, Harris County, Texas, was originally reported to the Harris County Pollution Control Department (HPCPD) in February, 1991 by Mr Ray Dove Mr Dove currently operates CBS on the property adjacent to the site HPCPD referred the site to the Texas Water Commission (TWC) in March 1991 The TWC conducted a site visit and prepared a report requesting that a state funded cleanup be conducted at the site On December 12, 1991, the United State Environmental Protection Agency Emergency Response Branch (EPA/ERB) received a request letter from the TWC to investigate the potential for an emergency removal action at the site According to the TWC report, the materials at the site were originally part of a shipment which was to be salvaged

On January 2, 1992, the OSC and Technical Assistance Team (TAT) collected drum and soil samples during a site assessment at CBS and observed containers in advanced stages of deterioration Off-site samples were taken on September 10, 1992 to evaluate possible contamination migration Phase I Removal actions took place from October 6 to November 20, 1992 Phase II Removal actions began on March 29, 1993

Status of Actions

On April 12 and April 13, 1993, the four (4) remaining 25-yard roll-off boxes containing soil, PPE and site debris were removed from the site They were transported by Waste Processors, Inc to a Class I Non-hazardous Waste facility in Conroe, Texas operated by Western Waste Industries

COST INFORMATION - as of April 8, 1993

	Amount Budgeted	Cost To Date	Amount Remaining
Cleanup Contractor	\$500,000	\$237,961 94	\$262,038 08
EPA/TAT		Pending	
Intramural			
Contingency			

TOTAL	\$500,000	\$237,961 94	\$262,038 08
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TAT Representative Roberta Haglund

Case Closed

REFERENCE 16

CERCLIS# TXD988061446

**SITE ASSESSMENT REPORT
FOR
Card Blanc Salvage
North East Harris County, Texas**

September 30, 1992

Prepared for:

**J Chris Petersen
Deputy Project Officer
Emergency Response Branch
EPA - REGION 6**

Contract Number: 68-WO-0037



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International Specialists in the Environment

CERCLIS# TXD98806446

Date September 30, 1992

To Mike Williams, OSC
EPA Region 6, Emergency Response Branch

Thru J Chris Petersen, DPO
EPA Region 6, Emergency Response Branch

Thru Chris Quina, TATL
Region 6, Technical Assistance Team

From Maher Tanbouz
Region 6, Technical Assistance Team

Subj Site Assessment Report Card Blanc Salvage
North East Harris County, Texas
TDD# T06-9209-04
PAN# ETX1325SB

I INTRODUCTION

The EPA Region 6 Technical Assistance Team (TAT) was tasked on September 4, 1992 to conduct a site assessment at the Card Blanc Salvage (CBS) site. Specific elements of the site assessment included photo-documentation, preparation of a site sketch, summarize site conditions, utilize air monitoring as appropriate, adhere to SOP for site investigation, maintain site log book and forward POLREP(S) to OSC, advice and assist OSC as necessary, and other duties per demand of site assessment. On September 4, 1992, TAT met with Mike Williams (OSC), to document changes in site conditions. The OSC requested an additional soil sampling event. This sampling mission was conducted on September 10, 1992. TAT members Maher Tanbouz and Mariano Gomez participated in the sampling.

II BACKGROUND

The CBS site is located at 11548 East Hardy Road near the intersection of the Hardy Toll Road and Collins Road in northeast

Harris County, Texas (attachment A - site location map) Card Blanc Salvage is operated by Mr Ray Dove The site was originally reported to the Harris County Pollution Control Department (HCPCD) on February, 1991, by Mr Dove HCPCD referred the site to the Texas Water Commission (TWC) on October 31, 1991 TWC referred the site to the US Environmental Protection Agency (EPA) Emergency Response Branch (ERB) when it became apparent that immediate actions might be necessary to control contaminant migration offsite

A comprehensive site assessment, including drum and soil sampling was conducted by The TAT on January 2 - 3, 1991, with the final report issued on January 31, 1991 (TDD# T06-9112-005)

III ACTIONS TAKEN

TAT members Maher Tanbouz and Mariano Gomez met Mr Mike Williams (OSC) at the CBS site on September 4, 1992 The TAT activities included photo-documentation, and the determination of locations for the soil sample operations requested by the OSC TAT noticed that the drums were covered with plastic sheets as protection from hurricane Andrew (see attachment D - photographs) The TAT observed that the drums were leaking out to the drainage path leading to Mr Matranga's property located to the east of Mr Dove's facility (see attachment D - photographs)

On September 10, 1992, TAT collected three (3) soil samples one (1) sample was taken from drainage path on Mr Dove's property, and, two (2) samples were taken from Mr Matranga's property, next to the fence separating it from Mr Dove's property (see attachment C - sample location map) Soil samples were sent to the Ecology and Environment Inc Analytical Services Center in Buffalo, New York for the following tests Priority Pollutant Metals, Volatile Organic analyses (VOA), Semi-Volatile Organic analyses (semi-VOA), and Polychlorinated Biphenyl (PCB)/Pesticides analyses

At the time of this report the TAT had not received sample results The TAT will forward sample results under a separate cover upon receipt

ATTACHMENTS

- A Site Location Map
- B Site Sketch
- C Sample location map
- D Photographs
- E Unused Photographs and Negatives
- F Record of Communication (3 Pages)
- G Consent for access to property (1 Page)
- H Polreps# 1
- I Copies of Logbook pages (1-6 and 46)
- J Copy of TDD#T06-9209-04

CERCLIS# TXD988061446

**ANALYTICAL LABORATORY RESULTS
FOR
Card Blanc Salvage Site
Harris County Texas**

OCTOBER 8 1992

Prepared for

**J Chris Petersen
Deputy Project Officer
Emergency Response Branch
EPA REGION 6**

Contract Number 68-WO-0037



ecology and environment. inc.

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CERCLIS# TXD988061446

DATE October 8 1992

TO Mike Williams OSC
EPA Region 6 Emergency Response Branch

THRU J Chris Petersen DPO
EPA Region 6 Emergency Response Branch

THRU Chris Quina TATL
Region 6 Technical Assistance Team

FROM Maher Tanbouz
Region 6 Technical Assistance Team

SUBJ Analytical Laboratory Results Card Blanc Salvage
North East Harris County Texas
TDD# T06-9209-04
PAN# ETX1325SBA

The EPA Region 6 Technical Assistance Team (TAT) was tasked on September 4 1992 to conduct a site assessment at the Card Blanc Salvage (CBS) Site. The OSC requested an additional soil sampling event. This sampling mission was conducted on September 10 1992. Three (3) soil sample were collected and sent to Ecology and Environment's Analytical Services Center in Buffalo New York to perform Volatile and Semi-Volatile Organic Pesticides/PCB and Priority Pollutant Metals analyses.

The final report was issued on September 30 1992 (TDD# T06-9209-04). At the time of issuing the final report TAT had not received sample results. TAT stated in the final report that sample results will be forward under a separate cover upon receipt.

On October 7 1992 TAT received the sample results. Data Validation was conducted by TAT member Moshood Leshi (See Attachment A). The results of the analyses were unremarkable.

ATTACHMENTS

- A Data Validation Report
- B Analytical Laboratory Results
- C Copy of TDD# T06-9209-04

DATA VALIDATION REPORT

DATE October 8, 1992

SITE NAME AND LOCATION Card Blanc Salvage Site

PROJECT REFERENCES TDD # T06-9209-004

PAN # ETX1325SBA

PROJECT MANAGER Maher Tanbouz

DATA VALIDATED BY Moshood O Leshi

ANALYTICAL LABORATORY AND LOCATION Ecology and Environment
Analytical Services Centre, Buffalo, N Y

ANALYSIS PERFORMED Volatile and semi-volatile organics,
Pesticides/PCBs, and Priority Pollutant metals analyses

SAMPLE MATRIX Soil

NUMBER OF SAMPLES Three (3)

SAMPLE LIST 1, 2, and 3

OVERALL DATA ASSESSMENT AND GENERAL COMMENTS

According to the guidelines of the Office of Solid Waste and Emergency Response (OSWER) directive 9360 04-1, this data is considered acceptable and useable. The laboratory did not experience any problems during this analytical project. Samples show traces of Methylene Chloride and Acetone during volatile organics analysis. Both are due to application of these compounds during laboratory sample preparation.

DATA QUALIFICATION PARAMETERS

SAMPLE HOLDING TIMES All sample holding times meet the QA/QC criteria

ANALYTICAL INSTRUMENT PERFORMANCE

a Initial and continuing calibration All calibration procedures meet QA/QC criteria

b ICP Interference Check sample The lab performed an interference check analysis during the priority pollutant metals analysis

BLANK ANALYSIS Blank samples were analyzed and they all meet QA/QC criteria

ANALYTE QUATITATION Units of data reporting (including dilution factors if applicable)

All volatile, semi-volatile organics, and pesticide/pcb compounds analyzed for were found to be below the detection limits of analytical instruments Only four (4) priority pollutant metals have quantitation values above the detection limit of the instrument A detailed data summary for the samples and analytes found is hereby stated

UNIT OF REPORTING MG/KG OF SOIL

SAMPLE ID	1	2	3
ANALYTES			
CHROMIUM	3 9	5 1	2 9
COPPER	UND	15 4	7 1
LEAD	13 5	58 2	33 8
ZINC	36 0	148 0	118 0

REFERENCE 17



DAN N MACLEMORE III

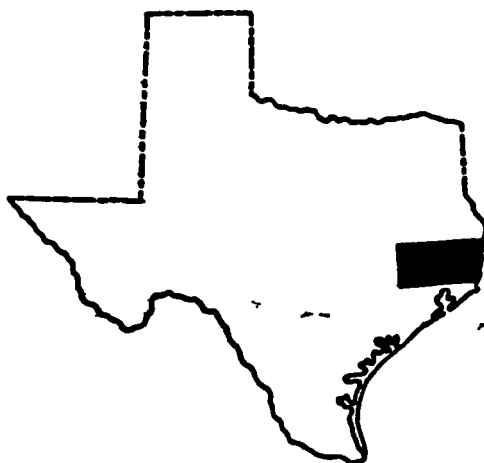
**BUREAU OF ECONOMIC GEOLOGY
THE UNIVERSITY OF TEXAS AT AUSTIN
AUSTIN, TEXAS 78712**

PETER T FLAWN, *Director*

GEOLOGIC ATLAS OF TEXAS

Beaumont Sheet

Scale: 1:250,000



February 1968

REFERENCE 18

T: 6: 17/

DAN N MACLEMORE III

THE UNIVERSITY OF TEXAS BULLETIN
No. 3232: August 22, 1932

THE GEOLOGY OF TEXAS

Volume I
Stratigraphy

E. H. SELLARDS, W. S. ADKINS, F. B. PLUMMER

Bureau of Economic Geology
E. H. Sellards, Director

Seventh Printing 1978



PUBLISHED BY
THE UNIVERSITY OF TEXAS
AUSTIN

the Lissie formation is barren ground for the fossil hunter. The following vertebrates have been identified from the Lissie:

Trucifelis fatalis Leidy (7)	Equus complicatus Leidy (7)
Canis sp. (3)	Equus francisci Hay (5)
Cistudo marnockii Cope (3)	Equus crenidens? Cope (3)
Megatherium sp. (2)	Equus tau? Owen (3)
Bison latifrons (Harlan) (6)	Equus semiplicatus Cope (3)
Mastodon serridens Cope (4)	Equus excelsus Leidy (3)
Glyptodon petaliferus Cope (3)	Equus occidentalis? Leidy (3)
Elephas columbi Falconer (6)	Camelid (3)
Elephas primigenius (Blumenbach) (3)	Ox (2)
Elephas imperator Leidy (6)	Tapir (2)

Localities from which above fossils were collected—

1. Two feet above base of gravel at La Loma de la Cruz, Mexico, 3 miles east of Rio Grande City, Starr County.
2. Banks of Brazos River; no exact localities recorded.
3. Taranchua Creek, a branch of San Diego Creek, near San Diego, Duval County (erroneously recorded as Nueces County in old reports by Cope).
4. East Texas; no exact locality given by Cope.
5. Shallow well in northern Wharton County, depth 25 feet.
6. Bee County; no exact locality given.
7. Hardin County; no exact locality given.

BEAUMONT CLAY²⁶⁷

Definition.—The Beaumont clay was named by Hayes and Kennedy (692, p. 27, 1903) for the exposures in the vicinity of Beaumont, Jefferson County. Previously these clays along the Gulf Coast had been referred to as Port Hudson formation by Hilgard²⁶⁸ and Loughridge (1017, pt. 1, p. 680, 1884) and as coast clays by Dumble (478, p. 564, 1894). Hayes and Kennedy (692, pp. 27-29, 1903) defined the Beaumont as the clay deposits between the Columbia sands (now Lissie sands) and the overlying Port Hudson silt of recent age. The name has been used in the same way by all later writers. The Beaumont is unique among Cenozoic formations of Texas in maintaining one geologic name during the last three

²⁶⁷LITERATURE.—Hilgard, E. W., Summary of results of a late geological reconnaissance of Louisiana: *Am. Jour. Sci.*, 2d ser., vol. III, pp. 332-343, 1869. Loughridge, R. H., 1017, vol. 5, pt. 1, p. 680, 1884. Dumble, E. T., 478, pp. 561-566, 1894; 506, pp. 269-272, 1918. Hayes, C. W., and Kennedy, W., 692, pp. 27-29, 1903. Fenneman, N. M., 537, pp. 13-16, 1906. Doussan, A., 415, pp. 30-81, 1911; 421, pp. 110-113, 1921. Udden, J. A., Baker, C. L., and Bliss, E., 1652, pp. 94-95, 1916. Trowbridge, A. C., 1610, p. 100, 1923; 1613a, pp. 208-218, 1932. Bailey, T. L., 38, pp. 113-117, 1923. Barton, D. C., 70, pp. 359-362, 1930; 74, pp. 1301-1320, 1930.

²⁶⁸Hilgard, E. W., Summary of results of late geological reconnaissance of Louisiana: *Am. Jour. Sci.*, 2d ser., vol. III, pp. 331-346, 1869.

decades. Geologists are in general agreement regarding its definition. It consists of 400 to 900 feet of clay and marl interbedded with lentils of clay between the Lissie formation and surface silts, surface terrace and alluvial deposits. The type locality is regarded as the shallow well sections in the vicinity of Beaumont. The surface soil at Beaumont is terrace material deposited by the waters of Neches River. Beneath these silts the drill encounters 400 feet of clay mixed with a little sand. The section of a well drilled at the Gulf Colorado and Santa Fe Railroad station at Beaumont is as follows:

	Depth Feet
Recent—	
Clay and soil	0-6
Sand	6-8
Beaumont clay—	
Clay blue	8-45
Sand containing shells	45-49
Clay blue containing thin streaks of sand	49-120
Thickness penetrated	112

The Beaumont clay is well exposed in most of the deeper drainage ditches around Houston, Harris County, Beaumont, Jefferson County and along the bluff of the bay shore at Corpus Christi, Nueces County.

Regional geology.—The Beaumont clay occupies a flat featureless treeless coastal plain extending in a belt about 40 miles wide about 10 to 15 miles from the coast from Sabine River on the east to Olmos Creek in southern Kleberg County on the south. In the Rio Grande valley in Hidalgo and Willacy counties it is covered by recent and wind-blown sand and silt, but it is reached at slight depths in all wells. It is essentially a late coastal plain formation that stretches from the Mississippi delta to Tamaulipas Range in northeastern Mexico. Along the Gulf Coast the Beaumont clay is overlain by recent wind-blown river and beach deposits. It dips southeastward and extends beneath beach sand and waters of the Gulf as far as the continental shelf. Its thickness is fairly uniform, ranging from 450 to 900 feet with an average of about 700 feet as shown in the following table:

LOCALITY	COUNTY	THICKNESS Feet	AUTHORITY
Roxana Pet. Co., Seaburn No 3			
Stratton Ridge _____	Brazoria	930	F B Plummer
Northwest side of Bryan Heights			
salt dome _____	Brazoria	567	Wm Kennedy
Water well at Chenango _____	Brazoria	830	Do
Water well at Amsterdam _____	Brazoria	822	Do
Water well at Thompson 12 mi			
S of Richmond _____	Fort Bend	186	Do
Well ½ mi N of Markham oil			
field _____	Matagorda	541	Do

Stratigraphy—The Beaumont clay lies unconformably upon the Lissie formation and is overlain unconformably by stream deposits and wind blown sands. It has not been subdivided into smaller units. Throughout its extent it is more or less a unit of plastic, poorly bedded clay interbedded with lentils and more or less continuous layers of sand. Details of its stratigraphy are best illustrated by the following described section.

Section²⁶⁰ of the Beaumont clay in a well (from 6 to 370 feet) on the V E Darstron farm, three fourths of a mile north of Oliva, Calhoun County

	Thickness Feet
Clay mottled pink and green calcareous _____	24
Clay light green calcareous _____	30
Shell bed, containing fragments of oysters, barnacles, clams (<i>Rangia</i> sp) _____	10
Clay green and pink, calcareous _____	50
Clay green and reddish pink, fairly hard calcareous clay _____	20
Clay pink, hard, calcareous _____	20
Clay green calcareous, medium hard _____	40
Clay blue, noncalcareous, medium hard _____	30
Clay reddish pink, medium hard _____	20
Clay blue, plastic, medium hard _____	35
Shell bed, containing fragments of oysters and other shells, and thin layers of light brown sand _____	20
Clay pink calcareous, containing fragments of oyster shells _____	15
Clay green and pink, calcareous, medium hard _____	32
Sand, light brown, calcareous, coarse grained _____	18
Total thickness measured _____	364

²⁶⁰ Sourced by Alexander Deussen 421 p 11. 1924

Section 1 of Beaumont clay exposed on Brazos River near the former wagon bridge at Richmond Fort Bend County

	Thickness Feet
Recent—	
Sand, grayish red river sand	15
Beaumont clay—	
Sand red with grav patches and indurated sufficiently to form a bench	10
Clay bluish gray sandy containing calcareous nodules exposed at water's edge	15
Total thickness measured	40

Sedimentology—The Beaumont sediments were deposited largely by rivers in the form of natural levees and deltas which coalesced by shifting of the river mouths along the coast, and to a less extent by marine and lagoonal waters in the bays and embayments between stream ridges and delta banks. As the river mouths and hence the levees and delta levees shifted the marine and lagoonal deposits of the interdelta areas were buried beneath the deltaic sediments. The resulting formation is largely deltaic interbedded in places with marine and lagoonal beds. Northward these delta beds are contemporaneous and continuous with the later terraces that occur along all the drainage lines north of the Beaumont clay outcrop. Barton (70 pp 359-382 1930) has described admirably the depositional process and points out (74 p 1309 1930) that sand was deposited on the terraces and on the crests of the natural levees close to the old stream channels, sandy clays on the flanks and compact clays in the black bottoms between stream lines. By mapping the sands he has worked out traces of many of the ancient stream lines in the present Beaumont clay surface and found that Beaumont clay soils grade from fine sandy loams on the crests of the ridges into clay loams and from clay loams into clays in the depressions. Near the coast the black clays in places contain marine fossils. A knowledge of the method of deposition of the Beaumont clay where the ancient ridges, delta bedding and shifting of stream channels can be observed enables one to understand better the origin of similar Gulf Coast formations of earlier age.

Measured by William Kennedy. Geology of oil prospects of the lower Brazos River valley. Unpublished manuscript.

Much of the sandy clay of the Wilcox Cockfield Catahoula and Lagarto undoubtedly owes its origin to processes of deposition similar to those exhibited in the Beaumont formation

Lithology —In the northeast Gulf Coast area the Beaumont formation consists according to information derived from well sections of about 60 per cent clay 20 per cent silt and 20 per cent sand In the central Gulf Coast the formation in some sections is 80 per cent to 90 per cent clay In the Rio Grande valley the proportion of sand and gravel appears to be much larger and the formation contains 75 or 80 per cent sand with considerable gravel and some limestone originally deposited as caliche The sands of the Beaumont are light gray or bluish gray medium to fine grained and range in size from one fourth to one sixteenth of a millimeter in diameter down to minute grains of silt one-sixty fourth of a millimeter with a large part of the sand below one-eighth of a millimeter in diameter The sand is made up largely of quartz and chert grains together with fragments of recent shells a small amount of pyrite and flakes of mica and the usual list of rare heavy minerals similar to the list given for the Oakville formation Some of the samples from south Texas differ in containing a larger percentage of grains derived from igneous rocks such as red and pink feldspar rose quartz, granite and magnetite

The clay is bluish gray yellowish gray pinkish gray purple and some shades of red It is in most places calcareous in composition and contains calcareous nodules rarely calcareous concretions and fragments of more or less decomposed wood In most places the clay is highly colloidal and when wet forms a thick, very sticky mud difficult to traverse with car or wagon in the rainy season These clays are characterized by their low content of lime and comparatively high silica content The analyses undoubtedly represent the nonmarine portion of the Beaumont clay Other deposits particularly some of those containing oyster beds, have a higher percentage of lime The following analyses reported by Ries (1320 p 241 1908) show the chemical composition of typical samples of Beaumont clay in Harris County

	HOUSTON	HARRISBURG	CEDAR BAYOU
Silica (SiO_2)	89.0	80.84	85.60
Alumina (Al_2O_3)	3.69	8.09	6.71
Ferric oxide (Fe_2O_3)	1.65	2.7	1.44
Lime (CaO)	0.47	1.44	Tr
Magnesia (MgO)	0.65	0.26	0.43
Soda (Na_2O)	0.06	0.10	0.65
Potash (K_2O)	Tr	Tr	0.50
Titanic acid (TiO_2)	0.84	0.78	1.00
Water (H_2O)	1.62	6.00	3.10
Total	97.98	99.76	99.43

Distinguishing characteristics—The Beaumont clay can be recognized by the following criteria

- 1 Flat featureless surface The surface of the Beaumont is a flat featureless treeless plain undissected by broad valleys. The streams except the large rivers flow in narrow channels bordered with sand and silt built up slightly above the plain surface. In all clay formations north of the Beaumont the main streams have broad valleys.
- 2 Soils The surface soil derived from the Beaumont is typically dark heavy clay soil exceedingly sticky when wet and hard when dry and known as the Lake Charles soil. The soil of the Liasie formation below and recent silts above are light silt loams.
- 3 Water holes or pitted prairies The surface of the Beaumont clay has in many places small hollows 10 to 15 feet in diameter locally known as "blow outs" or "hog wallows." These are small spots of poor drainage where a slight excess of alkali prevents or hinders growth of grass and weeds. During dry periods the wind removes dust and after a time forms a slight hollow. Rain water fills the depression and after evaporation leaves the bottom covered with mud cracks and films of dried up alkaline silt which is removed by the next dry wind storm, so that the pits in uncultivated areas are gradually deepened to depths of 20 to 30 inches. The pits occur also on the Liasie plain and other poorly drained areas where clay is the surface formation. They are, however more common and more characteristic of the Beaumont plain.
- 4 Pimple prairies Small knolls 10 to 25 feet in diameter and 1 to 4 feet high occur in clusters or belts over the flat surface of the Beaumont plain in certain areas where patches of silt occur. These pimple like knolls are especially common along the sandy belts produced by minor levees of former temporary streams.

They occur also on the Lissie formation and on other silty formations in east Texas and Louisiana. They are especially noticeable however on the Beaumont plain, where any slight elevation is noticeable in contrast to the generally featureless surface. These knolls were formed by the action of wind at a time when the soil was not fixed by so heavy a vegetation as at present and are thought to be ancient small dunes now nearly obliterated by weathering and erosion. They are composed of silt and superimposed on an old soil line of clay or hard silty clay. Veatch and others²⁷¹ have discussed the origin of these interesting features in much detail.

- 5 Wood and partly decomposed organic matter. The Beaumont clay contains much organic detritus in the form of cypress logs, rotten and partly decomposed tree trunks, peat, and plant detritus of various kinds. None of this is mineralized or lignitized as is the wood in the older formations.
- 6 Invertebrate fossils. The Beaumont clay contains in a few places near the coast oyster and clam shells and rarely a shell bed made up of large numbers of *Ostrea virginica* Gmelin and *Rangia cuneata* (Gray).

Paleontology and correlation—The Beaumont clay contains few fossils along its outcrop. In a few places brackish water and marine shells have been found and rarely a bone or tooth of a vertebrate. Shells in this formation are likely to belong to one or two species that occur in large numbers. The most common is *Rangia cuneata* (Gray), a small smooth surfaced clam that occurs in reefs or banks from 3 to 15 feet thick extending laterally for 30 to 75 feet. Such concentrations of shells in piles has been explained as the work of Indians who undoubtedly lived on the animal. Charred wood, arrow heads and in some places Indian bones have been found in the shell heaps. Pearce, who has examined them critically, however, believes that the piles of shells are not kitchen middens that they antedated the Indian remains and served merely as temporary camp sites. He believes that these shell deposits are simply small reefs formed by wave and river action. The shells are deposited

²⁷¹ Veatch, A. C. 1689 pp. 310-311. 1905. 1690 pp. 350-351. 1905. 1691 pp. 55-59. 1906. 1692 pp. 34-36. 1906. Liddell, J. A. 1624 pp. 819-851. 1906. Hill, R. T. 813 pp. 704-706. 1906. Campbell, M. R. 193 pp. 708-717. 1906. Wright, I. H. 1729 pp. 818-819. 1906. Fern, W. 533 pp. 583-584. 1906. Hobbs, W. H. 835 pp. 245-256. 1907. Dumble, E. T. 506 pp. 774. 1918. Bell, T. L. 38 pp. 4-30. 1923. Hill, M. 647d pp. 218-224. ?

²⁷² Pearce, J. E. The paleontology of Texas. Am. Assoc. Geol. 34 pp. 671-672. 1932.

originally in the silt and clay and later they are washed out by the waves and exposed shells and wash them up into beach ridges along the head of the bay or near the mouth of the stream. This process is cumulative until a 'reef' is formed. Such reefs are found at Grigsby Bluff on Neches River, Shell Bluff near the mouth of Sabine River around the head waters of Trinity Bay on Oyster Creek and along San Jacinto River in Texas. They occur also in the low bluffs along Black Lake near Hackberry Island in Cameron Parish, Louisiana. The shell deposits differ from the ordinary beach barrier ridge in that they are parallel to the old stream beds and are formed by the combined action of the streams and waves instead of by shore currents and waves. *Ostrea virginica* Gmelin occurs also in the Beaumont formation both singly and in beds of from six inches to a foot in thickness. The oyster beds can be traced in some places for several miles. Oyster beds of this type however are rare in Texas. Near Lake Charles, Louisiana, such a layer has been mapped half way across the parish. Rarely the tooth of an elephant mammoth or horse is reported in this clay. One good specimen from the mammoth *Elephas imperator* Leidy was found by the writer on Big Creek 8 miles south of Richmond, Brazoria County. Another large specimen was discovered by August Isle in the Beaumont clay 9 miles south of Garwood in Wharton County. Fossil recorded from the Beaumont clay are as follows:

<i>Rangia cuneata</i> (Gray) (1)	<i>Neverita duplicata</i> Say (3)
<i>Ostrea virginica</i> Gmelin (1-3)	<i>Natica</i> sp. (3)
<i>Astrangia</i> sp. (3)	<i>Leda acuta</i> Say (3)
<i>Mellita</i> sp. (3)	<i>Arca pexata</i> Say (3)
<i>Terebra protexta</i> Conrad (3)	<i>Arca incongrua</i> Say (3)
<i>Terebra dislocata</i> Say var. (3)	<i>Arca transversa</i> Say (3)
<i>Mangilia cerinella</i> Dall (3)	<i>Diplodonta semiasper</i> Philippi (3)
<i>Cancellaria</i> sp. (3)	<i>Cardium magnum</i> Linne (3)
<i>Oliva literata</i> Lamarck (3)	<i>Tellina</i> (Angulus) texana Dall (3)
<i>Olivella mutica</i> Say (3)	<i>Strigilla flexuosa</i> Say (3)
<i>Natica</i> sp. (3)	<i>Chione cancellata</i> Linne (3)
<i>Anachis avara</i> Say (3)	<i>Anomalocardia rostrata</i> Savage (3)
<i>Anachis obesa</i> Adams (3)	<i>Abra aequalis</i> Say (3)
<i>Purpura floridana</i> Conrad (3)	<i>Petricola pholidiformis</i> Linne (3)
<i>Purpuridella</i> sp. (3)	<i>Pholas costata</i> Linne (3)
<i>Cerithium floridanum</i> Morch (3)	<i>Donax texasiana</i> Philippi (3)
<i>Cerithium muscarum</i> Say var. (3)	<i>Mulinia lateralis</i> Say (3)
<i>Scala humphreysi</i> Kiener (3)	<i>Corbula barrattiana</i> C. B. Adams (3)
<i>Turritella</i> sp. (3)	<i>Corbula swiftiana</i> C. B. Adams (3)
<i>Littorina littorea</i> Say (3)	<i>Elephas imperator</i> Leidy (2)
<i>Cyprina</i> sp. (3)	

Localities recorded in above list—

- 1 Well 4 miles southwest of La Ward Jackson County
- 2 Robstown Nueces County
- 3 Depth of 370 feet in a well near Alligator Head Calhoun County
(species identified by T W Vaughan)

Economic resources—The only features of economic value in the Beaumont clay are its highly colloidal black or dark gray acid soils classified by Carter as Lake Charles soils and its brick clays. The principal type of soil on this formation is clay of the calcareous character. It produces open prairie grasslands which characterizes the coastal plain. This grassland constitutes the grazing areas of south Texas and thousands of head of Brahma cattle are raised along this belt annually. Near the cities and towns the soil is intensively cultivated and supports extensive truck gardens and fig orchards. In Matagorda Jackson and Jefferson counties where water for irrigation is available rice is raised on a large scale. Most of the Beaumont clay is too calcareous and has too high a shrinkage coefficient to produce a high grade of brick. Small brick yards however are in operation near the town of Sheldon 12 miles east of Houston at Harrisburg and at Cedar Bayou Harris County. At Beaumont in Jefferson County a fair quality of common yellow pressed brick is manufactured.

PLEISTOCENE STREAM DEPOSITS

DEFINITION

Strata of Pleistocene age occur in the form of terraces along all the principal stream courses north and northwest of the outcrop of the Lissie formation in bolsom deposits in the intermontane valleys of the Trans Pecos Texas and in ancient stream valleys cut in the surface beds of the Llano Estacado of northwest Texas.

SUBDIVISIONS

Two Pleistocene deposits north of the Gulf Coast have been named as follows

Leona formation
Tule formation

REFERENCE 19

THE STATE OF TEXAS WATER QUALITY INVENTORY

**6th Edition
1982**



**Prepared by
TEXAS DEPARTMENT OF WATER RESOURCES**

**Pursuant to
SECTION 305 (b)
FEDERAL WATER POLLUTION CONTROL ACT**

(As amended)

LP-59

San Jacinto River Basin

The East Fork and West Fork of the San Jacinto River merge in the headwaters of Lake Houston. The river is tidally affected below Lake Houston Dam, and becomes a part of the Houston Ship Channel before entering Galveston Bay. The river is 85 miles long, and approximately 2,372,000 people live within the basin.

Water quality in the upper portion of the watershed is good. It progressively deteriorates toward the lower part, especially in the Houston Ship Channel, due to the large quantity of industrial and municipal wastewater discharges, urban runoff and nonpoint source loads from the Houston metroplex. However, water quality in the Channel has improved over the past few years due to improved wastewater treatment. This is substantiated by the presence of aquatic and/or marine organisms in areas where few had previously been collected.

The East Fork above Lake Houston and its tributaries receive natural loads from heavily forested areas resulting in several low pH measurements. The West Fork above Lake Houston and its tributaries receive proportionally more waste loads, but are able to assimilate the wasteloads without developing water quality problems.

SAN JACINTO RIVER BASIN

Ground-Water Resources

The Gulf Coast Aquifer underlies the entire San Jacinto River Basin. The aquifer contains the Catahoula, Oakville, Lagarto, Goliad, Willis, Lissie, and Beaumont Formations, and consists of a complex system of interbedded sand and shale. The aquifer extends to a maximum depth of about 3,000 feet, with net sand thickness ranging from 400 to 1,200 feet. Yields of large capacity wells average about 1,800 gpm, but locally wells produce up to 2,900 gpm. The water in the aquifer generally contains less than 500 mg/l total dissolved solids.

Water Uses I, II, III, IV, V, VI

Water Quality Problems

Land surface subsidence, saline water encroachment, and surface fault activation have occurred. The land surface in the southeastern part of the basin has subsided over seven feet as a result of heavy pumpage and corresponding decline in artesian pressure in the Gulf Coast Aquifer. Saline water has intruded into fresh water zones in the southern part of the basin due to decline in artesian pressure.

A General Distribution and Properties of Aquifers

Figures 2 and 3 illustrate the geographic distribution of the state's major and minor aquifers. A major aquifer is defined as one producing large quantities of water in a comparatively large area of the state, whereas minor aquifers produce significant quantities of water within smaller geographic areas. Minor aquifers are especially important in Texas as they constitute the only significant source of water supply in some regions. The characteristics of each major and minor aquifer within a river and coastal basin are briefly described.

B Water Use

Ground water comprises approximately 70% of the total water used by Texans for domestic, municipal, industrial, and agricultural purposes. For purposes of this section, the following ground-water uses are designated and listed in the discussion of the basin's aquifers:

- I - Municipal (public and domestic)
- II - Manufacturing
- III - Steam-Electric Power Generation
- IV - Irrigation
- V - Mining
- VI - Livestock

C Ground-Water Availability

The average annual ground-water availability from the major and minor aquifers in Texas ranges from approximately 10.2 million acre-feet in 1980 to 8.4 million acre-feet through the year 2029. These estimates utilize 5.1 million acre-feet as annual effective recharge, and the remainder is ground-water recoverable from storage in particular aquifers. Current appraisals indicate that approximately 397.6 million acre-feet is the total storage in these particular aquifers, of which about 327.8 million acre-feet is considered recoverable.

Table 9 shows a breakdown, by aquifer, of the ground-water availability in the state as a whole. Table 10 and Figure 4 give a detailed tabulation of the availability by aquifer for each river basin or coastal basin, and for each zone.

D Ground-Water Monitoring

A ground-water quality monitoring network consisting of some 5,600 observation wells is currently maintained by the department with 1,100 wells being sampled annually for the common constituents of natural ground-water. Local, regional, and other state and federal agencies are also involved in additional monitoring of the quantity and quality of Texas' ground-water resources.

For the general constituents of silica, calcium, magnesium, sodium, bicarbonate, sulfate, chloride, fluoride, nitrate, dissolved solids, total hardness, specific conductance, and pH, the department has a relatively complete base with data going back to the mid 1940's for the major and minor aquifers. Special constituents such as pesticides, herbicides, hydrocarbons, etc., are analyzed on the basis of citizen complaints or special investigations conducted by department staff.

Organic and inorganic data from the various monitoring networks is compiled into the Texas Natural Resource Information System, TNRIS, which are periodically distributed as departmental reports. A series of detailed reports are being prepared by the department which, when complete, shall describe the ground-water conditions of the state, including basic water levels and water quality data. The first report will cover Central Texas, followed by reports covering the Central and Lower Gulf Coast areas. The department anticipates completing this project by 1985.

E Water Quality Problems

Aquifers may be contaminated from either man-made or natural sources. The susceptibility of aquifers to contamination from man-made sources is influenced by factors such as population density, industrial development, agricultural development, water-well completion practices, areal extent of the formation (aquifer) outcrop, and rock or sediment types that crop out at the land surface. Susceptibility of aquifers from natural sources of contamination is affected by water quality zones within an aquifer, water quality differences between an aquifer and adjacent formations, water-well construction practices, and rock and/or sediment types that comprise an aquifer.

General water quality problems for each basin are described in the fact sheets. Numerous department reports containing specific information related to the susceptibility of particular aquifers to pollution, pollution sources, water quality changes, pollution complaints, and pollution inventories have been prepared by the Data and Engineering Services Division. The reader should consult the Reports Section of the department's 1981 Publication Catalogue for that information.

F Water Resources Problems for Areas of Texas

Expanded development of the state's water resources and pressures to satisfy numerous beneficial purposes have created local, regional, and statewide problems of varying intensity. While surface water quality continues to be a major concern, ground-water overdraft and quality degradation are particularly troublesome because of expanding economic activities that are ground-water dependent.

The department has identified numerous water resource problems and delineated them on the basis of eight geographic regions (Figure 5). These problems obviously overlap and solutions to any one problem should not be considered in isolation of other problems.

REFERENCE 20

T 17-6' 45'



TEXAS DEPARTMENT OF WATER RESOURCES

REPORT 236

**STRATIGRAPHIC AND HYDROGEOLOGIC FRAMEWORK OF PART
OF THE COASTAL PLAIN OF TEXAS**

By

**E T Baker Jr
United States Geological Survey**

**This report was prepared by the US
Geological Survey under cooperative agreement
with the Texas Department of Water Resources**

July 1979

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STRATIGRAPHIC AND HYDROGEOLOGIC FRAMEWORK OF PART OF THE COASTAL PLAIN OF TEXAS

By

E T Baker Jr
United States Geological Survey

ABSTRACT

The subsurface delineation of hydrogeologic units of Miocene and younger age and stratigraphic units of Paleocene to Holocene age establishes an interrelationship of these units statewide across much of the Coastal Plain of Texas. The 11 dip sections and 1 strike section which extend from the land surface to

7 600 feet (2 316 meters) below sea level provide continuity of correlation from the outcrop to the relatively deep subsurface. Sand containing water in less than 3 000 milligrams per liter of dissolved solids which is shown on the sections serves as an index of water availability of this quality.

STRATIGRAPHIC AND HYDROGEOLOGIC FRAMEWORK OF PART OF THE COASTAL PLAIN OF TEXAS

INTRODUCTION

This report has been prepared to illustrate the stratigraphic and hydrogeologic framework of a part of the Coastal Plain of Texas from the Sabine River to the Rio Grande. It is the outgrowth of a project that has as its ultimate objective the construction of a digital ground water flow model, if feasible or desirable, of at least a part of the Miocene aquifers in the Gulf Coastal Plain of Texas. The model would serve as a tool for planning the development of the ground water supplies. Work on the project is being done by the U.S. Geological Survey in cooperation with the Texas Department of Water Resources.

During the course of delineating the Miocene aquifers, which is basic to the design and development of the model, the scope of the study was broadened to include delineations of other hydrogeologic units, as well as delineations of stratigraphic units. As a result, units ranging in age from Paleocene to Holocene were delineated (Table 1). A relationship of stratigraphic units to designated hydrogeologic units was thus established statewide.

Eleven dip sections and 1 strike section are included in this report. The dip sections are spaced about 50 miles (80 km) apart with the most easterly one being near the Sabine River and the most southerly one being near the Rio Grande. Each dip section is about 100 miles (161 km) long and extends from near the coastline to short distances inland from the outcrop of the oldest Miocene formation—the Catahoula Tuff or Sandstone. The strike section, which is about 500 miles (804 km) long (in three segments), extends from the Sabine River to the Rio Grande and joins the dip sections at common control points. This section is from 50.75 miles (80-121 km) inland from the Gulf of Mexico and is essentially parallel to the coastline. The location of the sections and the Catahoula outcrop are shown on Figure 1.

The sections extend from outcrops at the land surface to maximum depths of 7,600 feet (2,316 m)

below sea level. Selected faunal occurrences were known or inferred by correlation from nearby well logs are included. The extent of sand that contains having less than 3,000 mg/l (milligrams per liter) dissolved solids was estimated from the electrical characteristics shown by the logs. This information included on all of the sections.

Although faulting is common in the Coastal Plain and is complex in some areas, all faults have been omitted from the sections to maintain continuity of stratigraphic and hydrogeologic boundaries. The disadvantage of such omission is of course, a representation of an unrealistic and simplistic picture of unbroken strata with uninterrupted boundaries. In reality, many of the faults have not only broken hydraulic continuity of the strata but more importantly, have become barriers to fluid flow or conduits for cross formational flow. The sections are presented in this report as Figures 2-15.

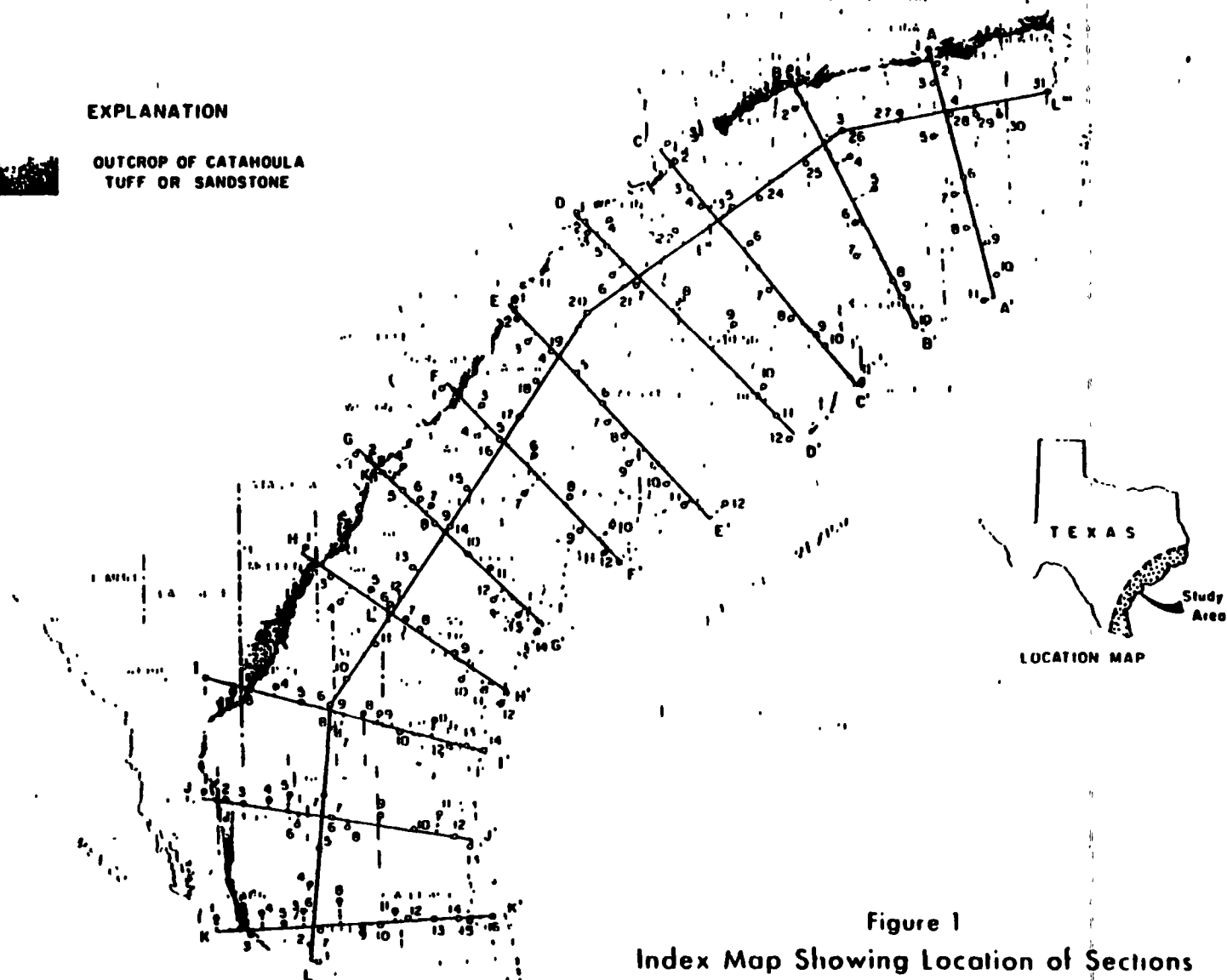
Acknowledgements

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EXPLANATION



OUTCROP OF CATAHOULA
TUFF OR SANDSTONE



LOCATION MAP

Figure 1
Index Map Showing Location of Sections

Geology from Barnes (1968a, b, 1974a, b, 1975) and modified from Darton, Stephens, and Gardner (1957) and from Barnes (1976, a, b, c).

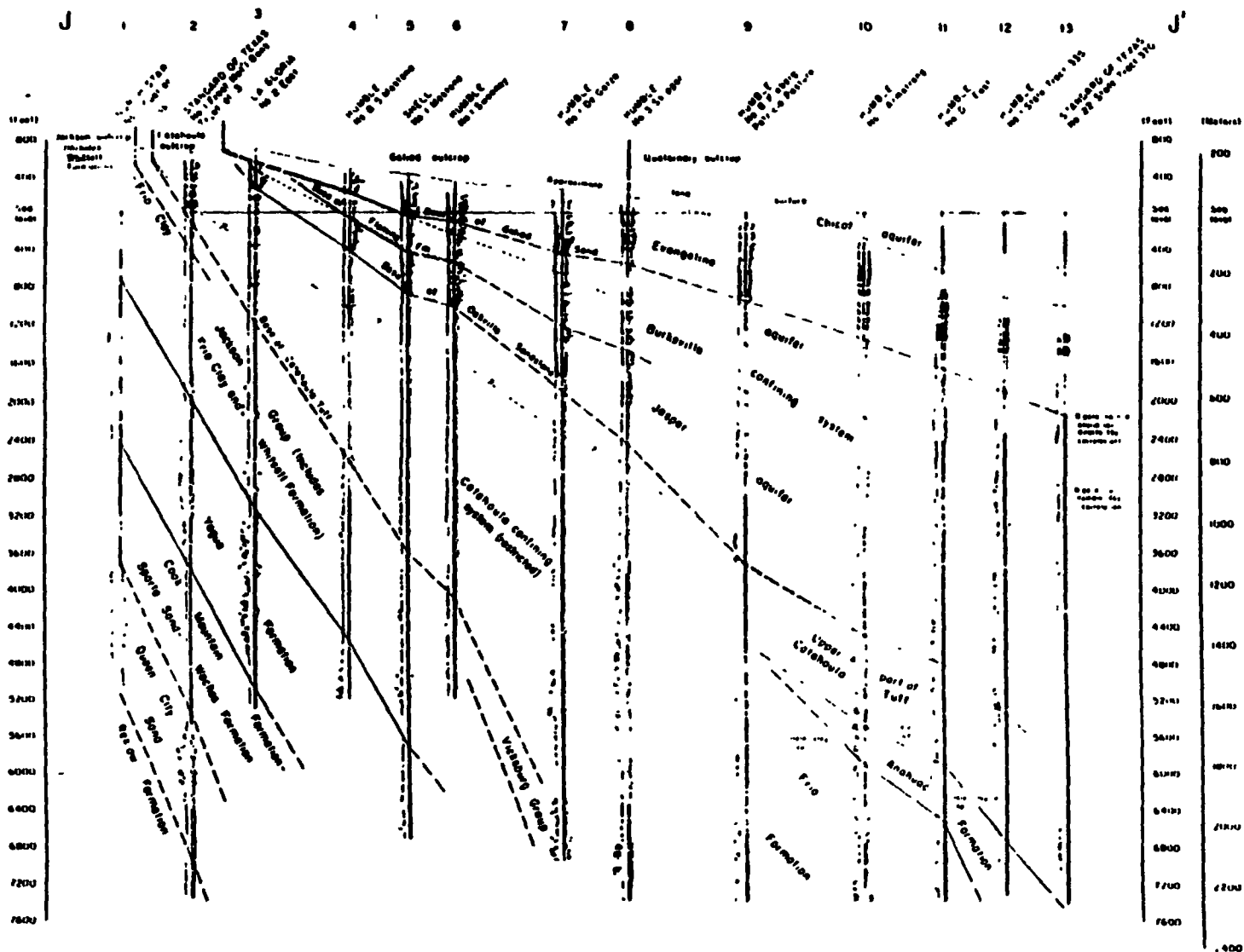


Figure II
Stratigraphic and Hydrogeologic Section II

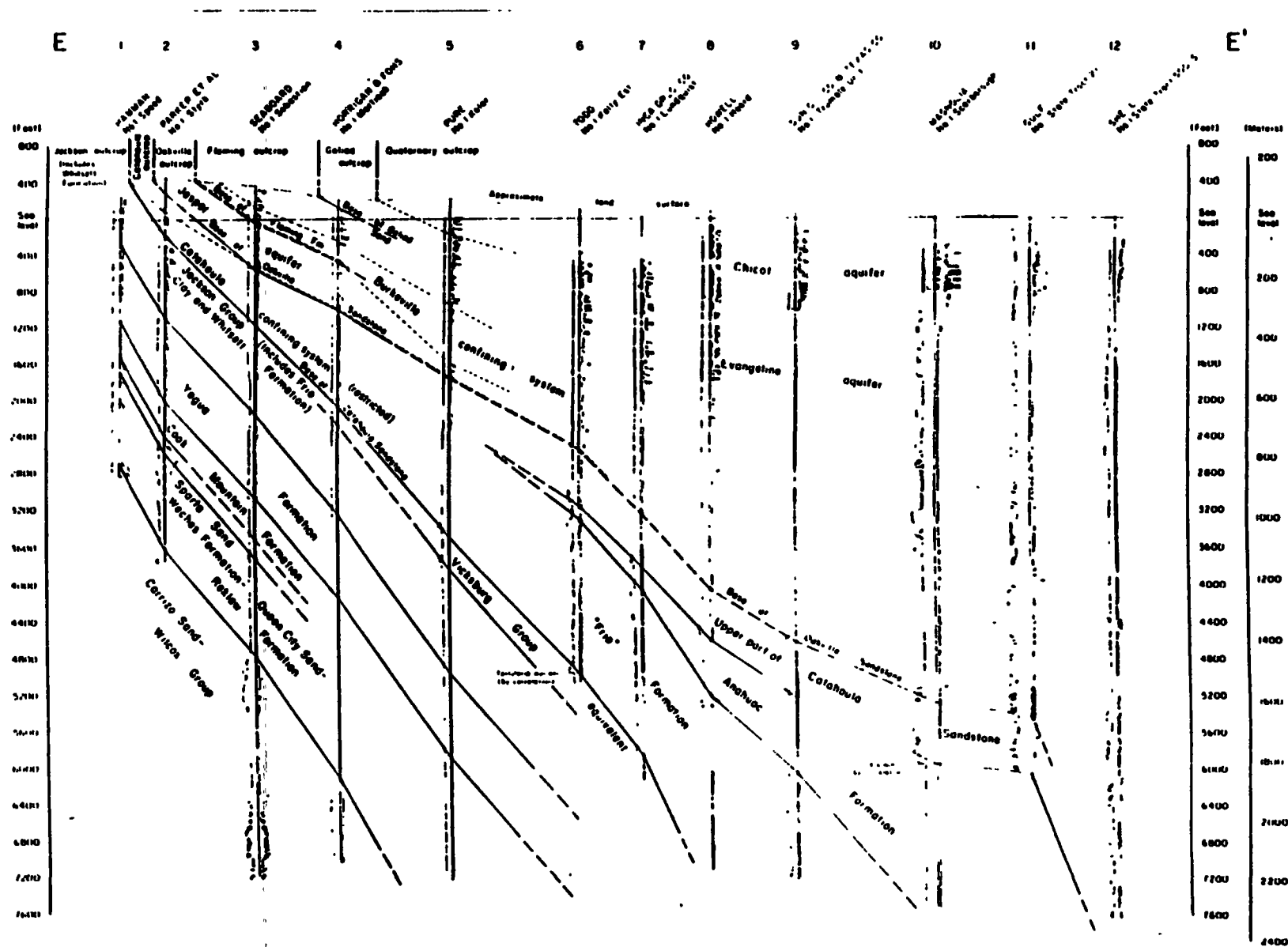


Figure 6
Stratigraphic and Hydrogeologic Section E-E'

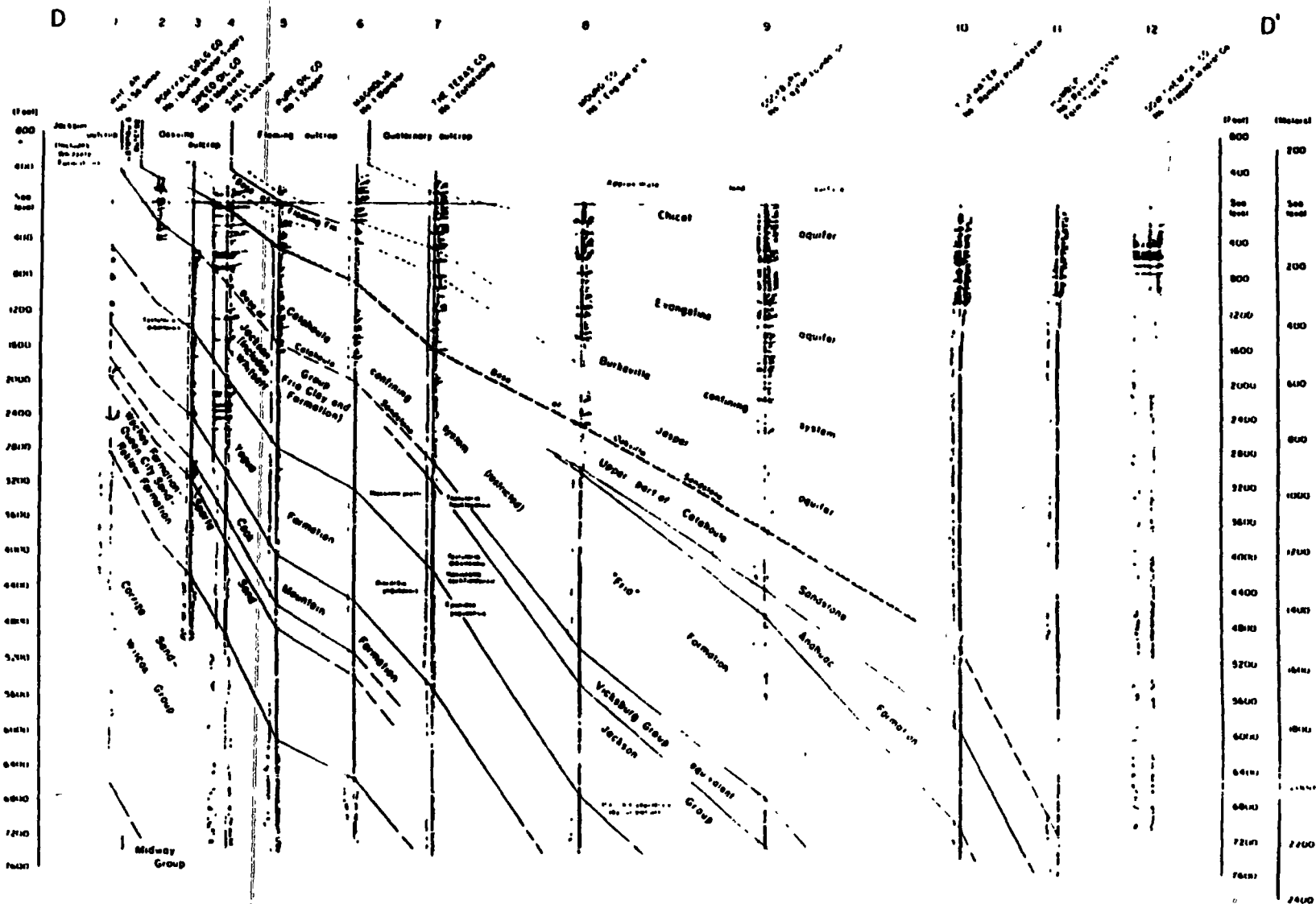


Figure 5
Stratigraphic and Hydrogeologic Section D-D'

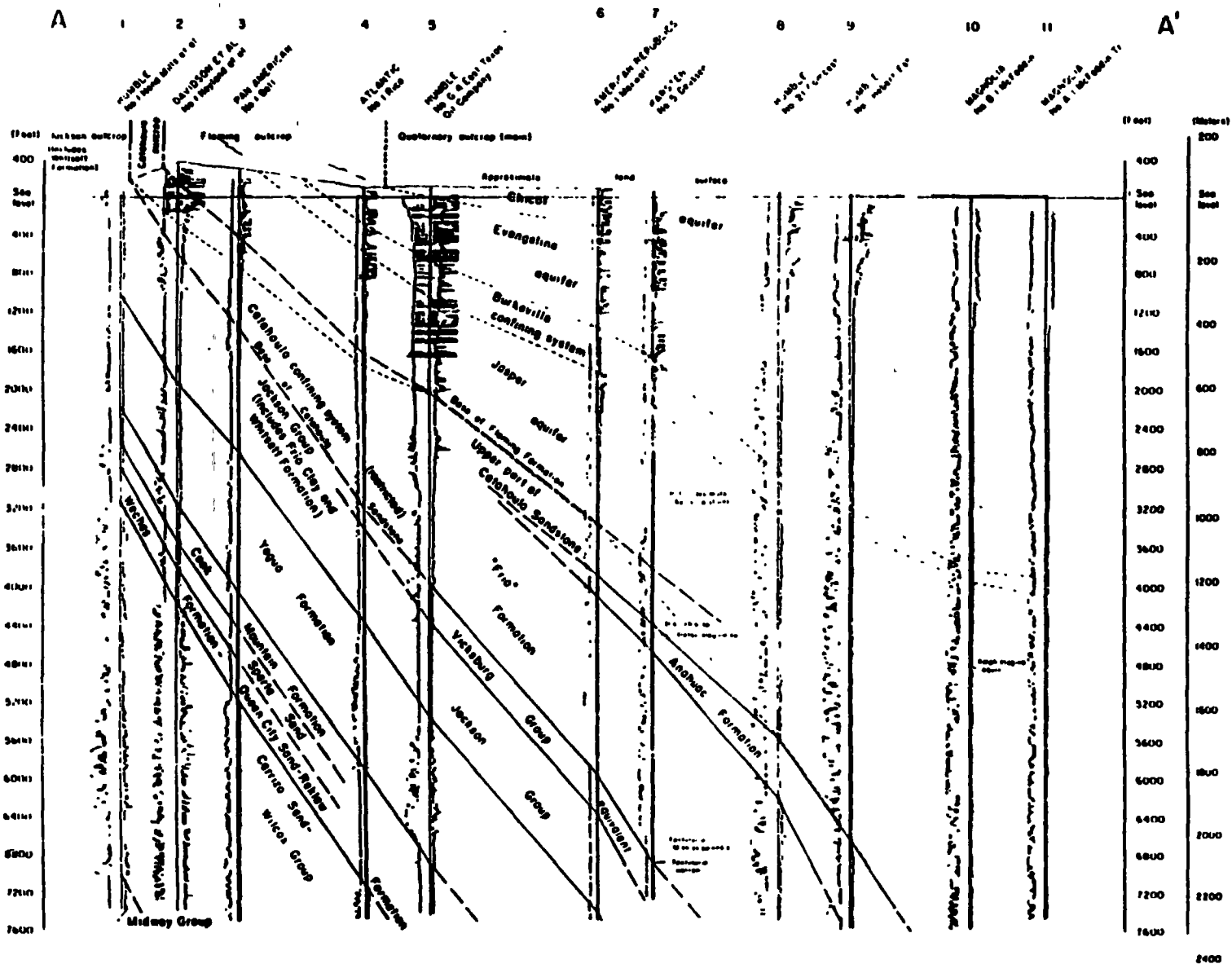


Figure 2
Stratigraphic and Hydrogeologic Section A-A'

and W. M. Sandeen (U.S. Geological Survey) of Houston, Texas, delineated the Chicot and Evangeline aquifers on the sections. Their contribution is gratefully acknowledged. Geologic sections and type logs of oil fields including faunal occurrences by the Houston Geological Society (1954, 1962), the Corpus Christi Geological Society (1954, 1955, 1967, 1972), and the South Texas Geological Society (1962, 1967) were extensively utilized as aids in identifying deep subsurface formations. The geologic sections of Eargle, Dickinson, and Davis (1975) served to identify near-surface formations in parts of South Texas.

Metric Conversions

For those readers interested in using the metric system, the metric equivalents of English units of measurements are given in parentheses. The English units used in this report have been converted to metric units by the following factors:

From	Multiply by	To obtain
feet	0.3048	meters (m)
miles	1.609	kilometers (km)

STRATIGRAPHIC FRAMEWORK

General Features of Deposition and Correlation Problems

Cenozoic sediments that underlie the Coastal Plain of Texas are tens of thousands of feet thick at the coastline. These clastic sediments of sand, silt, and clay represent depositional environments ranging from nonmarine at the outcrops of most units to marine where the units may carry a distinctive suite of fossils. Oscillations of ancient seas and changes in amount and source of sediments that were deposited caused facies changes downdip and along strike. For example, a time-stratigraphic unit having age equivalency may consist of sand in one area, sandy clay in a second area, and clay in a third area. Subsidence of the basin of deposition and rising of the land surface caused the stratigraphic units to thicken Gulfward. Growth faults (faults that were more or less continuously active) greatly increased the thickness of some stratigraphic units in short distances. All of these factors contributed to heterogeneity of the units from place to place and in turn makes correlation difficult.

Stratigraphic Units

In the discussion to follow, emphasis will be placed on stratigraphic units that are designated in this report as Miocene in age. Many of the correlation problems of the Cenozoic deposits involve these units to a large degree. Also, the main thrust of this report is directed at the Miocene in keeping with the ultimate objective of modeling the flow in the Miocene aquifers.

The stratigraphic nomenclature used in this report was determined from several sources and may not necessarily follow the usage of the U.S. Geological Survey.

Pre-Miocene

Delineation of most of the pre-Miocene units of Cenozoic age present relatively few problems of significance. This is especially true of the pre-Jackson units (Midway Group to Yegua Formation). The top of the Carrizo Sand of the Claiborne Group (included with the underlying Wilcox Group on the sections) can be easily delineated, which makes the position of the unit unmistakable in the subsurface. From about the Sabine River to the San Marcos Arch (section F-F, Figure 7 is centered over this structural feature), the top of the Carrizo Wilcox is about 3,000 feet (914 m) beneath the landward edge of the Catahoula outcrop. Southward from the San Marcos Arch into the Rio Grande Embayment of South Texas, its position steadily increases in depth to more than 7,000 feet (2,134 m) at the western end of section K-K (Figure 12).

Facies changes occur downdip in the Sparta and Queen City Sands of the Claiborne Group, and where these units grade into clay, delineation on a time-stratigraphic basis is virtually impossible from electrical log interpretation. The same problem affects the Yegua Formation of the Claiborne Group, although the Yegua remains sandy for greater distances downdip. It can be delineated by lithology on most of the sections in this report. Also, the presence of important faunal markers such as *Nonionella cockfieldensis* and *Ceratobulimina eximia* aid in locating the approximate top and base, respectively, of the Yegua regardless of its lithology.

The delineation of the Jackson Group is significant in establishing the framework for the Miocene units. This is because the outcropping Frio Clay of Oligocene(?) age of South Texas is completely overlapped in Live Oak County by the Miocene Catahoula (or is not recognized on the surface east of

this area. The overlap places the Catahoula in contact with part of the Whitsett Formation the uppermost formation of the Jackson Group in this area. East of the overlap to the Sabine River careful attention was required to properly separate on the sections the tuffaceous sand and clay interbeds of the Whitsett from the tuffaceous sand and clay interbeds of the overlying Catahoula. From Live Oak County southward the outcropping Frio Clay separates the Whitsett Formation from the Catahoula Tuff.

The age of the Whitsett although shown in Table 1 as Eocene in South Central Texas may be at least in part Oligocene in the eastern part of the State. Eargle, Dickinson and Davis (1975) consider the Whitsett to be Eocene at least from central Karnes County to southern McMullen County. Barnes (1975) likewise considers the Whitsett to be unquestionably Eocene no farther east than central Karnes County. From this area to the Sabine River Dr. V. E. Barnes (written commun. April 5, 1971) states that the Whitsett may climb timewise eastward and be largely Oligocene in East Texas. That the Nash Creek Formation of Louisiana which is considered to be largely Oligocene is equivalent to the Whitsett as mapped in Texas near the Sabine River and the Oligocene vertebrates which Dr. J. A. Wilson (Department of Geologic Sciences, University of Texas at Austin) collected from the Whitsett in Washington County show that this formation is at least part Oligocene at that site. Because of the probability that the Whitsett is Oligocene in part or in whole in much of the area the delineation of the Eocene Jackson Group is shown on the sections to include the Whitsett Formation.

The Frio Clay of Oligocene(?) age has been a controversial unit for decades. Geologists still do not agree on its subsurface equivalents or if it is even a separate stratigraphic unit from the Catahoula. The fact that many geologists have mapped the unit from Live Oak County to the Rio Grande lends support to the existence of the Frio Clay as a formation. The Geologic Atlas of Texas (Barnes, 1976a, b, c) shows that the Frio is mapped separately as a distinct formation from its overlap in Live Oak County to southern Webb County from there to the Rio Grande the Frio is undifferentiated from the Catahoula. The Frio outcrop that was used for control at the surface on the dip sections H-H to K-K (Figures 9-12) was modified from Darton, Stephenson and Gardner (1937) and from Barnes (1976a, b, c). East of the overlap in Live Oak County the Frio is presumed to be present in the shallow subsurface beneath the Catahoula with the erosional edge probably only a few miles downdip from the edge of the Catahoula outcrop.

The Frio Clay at the surface has been interpreted by the author to be at least in part the nonmarine time-equivalent of the subsurface Vicksburg Group—a marine biostratigraphic unit of Oligocene age that crops out east of the Sabine River and is characterized by the foraminifer *Textularia warreni*. The relationship is supported by Deussen and Owen (1939, p. 1630) and by the Houston Geological Society (1954). The Vicksburg equivalent east of Karnes County may also be at least a partial time-equivalent of the Whitsett whose probable Oligocene age in this area may in itself indicate an equivalency. Ellisor (1944, Figure 1 and p. 1365) supports this probability and illustrates the relationship in a geologic section. Additionally this probability is supported by the apparent correlation of the outcrop of the Vicksburg Group in Louisiana near the Sabine River as shown on the geologic map of Louisiana (Wallace, 1946) with the outcrop of the Whitsett Formation as shown on the Geologic Atlas of Texas (Barnes, 1968b). This relationship may be inferred on the dip sections from A-A to at least F-F (Figures 2-7) where the Vicksburg equivalent if projected to the outcrop would intersect the outcropping Whitsett.

Miocene

The stratigraphic framework of the units that are designated in this report as Miocene in age is complex and controversial perhaps more so than any other Cenozoic units. Geologists do not agree which units on the surface or in the subsurface are Miocene nor do they agree as to the relationship of the surface and subsurface units. The correct relationship may never be determined because faunal markers which exist in places in the subsurface do not extend to the outcrop and the heterogeneity of the sediments does not facilitate electrical log correlations.

The outcropping stratigraphic units that are assigned to the Miocene in this report are from oldest to youngest the Catahoula Tuff or Sandstone, Oakville Sandstone and Fleming Formation. The Frio Formation, Anahuac Formation and a unit that is referred to in this report as the upper part of the Catahoula Tuff or Sandstone are assigned by the author as possible downdip equivalents of the surface Catahoula although the Anahuac and Frio Formations may be Oligocene in age. Table 1 and the dip sections (Figures 2-12) illustrate this relationship.

The outcrop of the Catahoula, a pyroclastic and tuffaceous unit, has been mapped independently by various geologists with little modification from the Sabine River to the Rio Grande. Darton, Stephenson

and Gardner (1937) modified the unit's name from Catahoula Tuff to Catahoula Sandstone east of Lavaca County where the formation becomes more sandy

It may be seen on the sections that the thickness of the surface Catahoula increases downdip at a large rate in the subsurface to eventually include when the Anahuac Formation is reached the Frio Formation which underlies the Anahuac and the upper Catahoula unit. Deussen and Owen (1939 Figures 5 6 p 1632 and Table 1) in a study of the surface and subsurface formations in two typical sections of the Texas Coastal Plain (one in East Texas the other in South Texas) agree with this relationship. They disagree however with these units being Miocene and assign them to the Oligocene. Some oil-company geologists consider the Anahuac and Frio as separate formations (unrelated to the Catahoula) in the subsurface and also assign them to the Oligocene. As a consequence of this usage the upper Catahoula unit of this report is then usually referred to as Miocene which term is used instead of or interchangeably with Fleming. Holcomb (1964 Figure 2) in a study of the subsurface Frio Formation of South Texas places the Frio and Anahuac Formations as well as the surface Catahoula in the Miocene but does not admit to any Catahoula occurring above the Anahuac. He indicates that the Fleming Formation (Oakville Sandstone and Fleming Formation of this report) rests on the Anahuac. Dip sections especially F F G G and H H (Figures 7 9) show unmistakably that the Catahoula-Oakville contact on the surface can be accurately traced far enough downdip by means of electrical logs to show that the clearly discernible contact is several hundred feet above the Anahuac. For this reason the upper Catahoula unit above the Anahuac cannot be the Oakville. This contention is supported by Meyer (1939 p 173) and by Lang Winslow and White (1950 Plate 1).

The Anahuac Formation despite the controversial attention it receives is one of the most discernible formations in the subsurface. This marine biostratigraphic unit carries a rich microfauna of many tens of diagnostic species. These species are categorized into the *Discorbis* zone *Heterostegina* zone and *Marginulina* zone from youngest to oldest. Only a few of the diagnostic species (Table 1) are included with the dip sections in this report. The updip limit of the marine facies of the Anahuac ranges in depth from about 2 500 feet (762 m) below land surface in East Texas to about 4 000 feet (1 219 m) in the Rio Grande Embayment in South Texas. The unit is quite sandy south of the San Patricio County (south of section F H Figure 9) to the Rio Grande in contrast to its shaly character eastward from San Patricio County to the Sabine River.

The Oakville Sandstone and Fleming Formation are composed almost entirely of terrigenous clastic sediments that form sand and clay interbeds. Both formations are basically rock stratigraphic units that are distinguished and delineated on the basis of lithologic characteristics. Their boundaries in the Coastal Plain of Texas are discernible contacts in some areas and arbitrary ones within zones of lithologic gradation in other areas.

The Oakville Sandstone is most prominent on the surface and in the subsurface in the central part of the Coastal Plain. Here its predominantly sandy character is distinguished from the underlying tuffaceous Catahoula and overlying Fleming which is composed of clay and slightly subordinate amounts of sand.

The Oakville on the surface has been mapped as a formation from about the Brazos River at the Washington Grimes County line to central Duval County where its outcrop is overlapped by the Goliad Sand and remains overlapped to the Rio Grande. Beneath this overlap the Oakville apparently decreases in thickness or loses its predominance of sand or both. In either case its position in the shallow subsurface in parts of the Rio Grande Embayment is questionable on dip sections I I and K K (Figures 10 12). In the vicinity of the Brazos River the Oakville grades eastward into the base of the Fleming Formation and loses its identity. The position of the base of the Oakville in the deeper parts of the subsurface has been delineated on some of the sections merely as an approximation.

The Fleming Formation the uppermost unit of Miocene age in the Coastal Plain has been mapped on the surface in Texas from the Sabine River to central Duval County. From here like the Oakville it is overlapped by the Goliad Sand and remains beneath the Goliad to the Rio Grande.

The Fleming is lithologically similar to the Oakville but can be easily separated from the Oakville in some places by its greater proportion of clay. Plummer (1932 p 744 747) described the Lagarto as consisting of 75 percent marl or clay 15 percent sand and 10 percent silt with the clay beds being thicker and more massive and the sand beds being thinner and less massive than those of the Oakville. This description is reasonably accurate in some areas of the outcrop and shallow subsurface where the Fleming is separated from the Oakville (See sections I I J J and L L Figures 10 11 and 13). In other areas the Fleming on the outcrop and in the shallow subsurface contains a ratio of sand to clay that approximates that of the Oakville. Where the Fleming Formation is not separated from the Oakville and directly overlies the Catahoula from about Grimes

County to the Sabine River the percentage of sand in the formation increases eastward. In Jasper and Newton Counties the amount of sand in the section above the base of the Fleming greatly exceeds the amount of clay. This can be seen in wells 30 and 31 on strike section L L (Figure 15).

Delineation of the base of the Fleming from the to the deep subsurface has not been attempted on most of the sections because of complex facies changes. In southeast Texas on sections A A B B and C C (Figures 2-4) an approximate base of the Fleming is shown down dip to short distances beyond the pinchout of the Anahuac. The preponderance of sand above the Anahuac in this area however makes any delineation on the basis of electrical logs speculative. Deep wells near the coastline penetrate marine facies of the Fleming which carry a diagnostic fauna. Numerous species which serve to identify the formation have been described by Rainwater (1964) *Potamides marsoni*, *Amphistegina sp*, *Bigennerina humbleri* and *Bigennerina nodosaria var directa* are faunal markers indicated on some of the sections.

Post Miocene

Delineation of the stratigraphic units of Pliocene, Pleistocene and Holocene age has not been attempted. Correlation problems with most of these stratigraphic units are too numerous to solve by using only electrical logs. Delineation of the Pleistocene units—Willis Sand, Bentley Formation, Montgomery Formation and Beaumont Clay—is exceedingly difficult due to the lithologic similarity of the sediments and lack of paleontological control. The contact at the surface of the basal Quaternary with the Goliad Sand or older units is however shown on the dip sections.

The Goliad Sand of Pliocene age overlies the Miocene units in the deep subsurface as well as in places on the surface. Except for a few isolated outcrops it is otherwise entirely overlapped on the surface east of Lavaca County by Pleistocene deposits. Its inland extent beneath the overlap is presumed to be only several miles southeast from the most down dip exposures of the Fleming Formation. From Lavaca County to the Rio Grande the width of the Goliad outcrop gradually increases because the Goliad progressively overlaps older units in the Rio Grande Embayment of South Texas.

The Goliad Sand can usually be identified on the surface and in the subsurface by a preponderance of sand except in the far eastern part of the State where sand predominates from the base of the Miocene to the surface. In this area the identity of the Goliad cannot be

established with certainty. Delineation of the base of the Goliad has been made where outcrop control is available on the strike and dip sections west of Colorado County. The base of the Goliad has been approximated at about 2,200 feet (671 m) below sea level near the coastline on sections I I and J J (Figures 10, 11).

HYDROGEOLOGIC FRAMEWORK

The following discussion is restricted to the hydrogeologic framework of five units—Catahoula confining system (restricted), Jasper aquifer, Burkeville confining system, Evangeline aquifer and Chicot aquifer. A discussion of other hydrologic units of Cenozoic age is beyond the purpose and scope of this report.

The quality of the ground water that is indicated on the sections to be less than 3,000 mg/l of dissolved solids is referred to in this report as fresh to slightly saline water. This terminology follows the classification of Winslow and Kister (1956).

Catahoula Confining System (Restricted)

The Catahoula confining system (restricted) is treated in this report as a quasi hydrologic unit with different boundaries in some areas than the stratigraphic unit of the same name. Its top (base of the Jasper aquifer) is delineated along lithologic boundaries that are time stratigraphic in some places but that transgress time lines in other places. Its base which coincides with the base of the stratigraphic unit is delineated everywhere along time stratigraphic boundaries that are independent of lithology. No attempt was made to establish a lithologic (hydrologic) base for the unit which would have created a distinct hydrologic unit. Such effort would have involved a thorough hydrologic evaluation of pre-Miocene formations which is beyond the scope of the project.

In many places the Catahoula confining system (restricted) is identical to the stratigraphic unit but there are notable exceptions. These departures of the hydrologic boundaries from the stratigraphic boundaries are most prominent in the eastern part of the Coastal Plain near the Sabine River (Figure 15) in places in South Texas (Figure 11) and in numerous places at the outcrop and in the shallow subsurface. In these places the very sandy parts of the Catahoula Tuff or Sandstone (stratigraphic unit) that lie immediately below the Oakville Sandstone or Fleming Formation are included in the overlying Jasper aquifer. This leaves a lower

section from 0 to 2 000 feet (610 m) or more in thickness that consists predominantly of clay or tuff with some interbedded sand to compose the Catahoula confining (restricted) system. In most areas this delineation creates a unit that is generally deficient in sand so as to preclude its classification in these areas as an aquifer. Thus in much of its subsurface extent the Catahoula confining system (restricted) functions hydrologically as a confining layer that retards the interchange of water between the overlying Jasper aquifer and underlying aquifers.

The amount of clay and other fine-grained clastic material in the Catahoula confining system (restricted) generally increases downdip until the Anahuac Formation is approached. Below this unit the Frio Formation becomes characteristically sandy and contains highly saline water that extends to considerable depths.

Jasper Aquifer

The Jasper aquifer which was named by Wesselman (1967) for the town of Jasper in Jasper County, Texas, has heretofore not been delineated farther west than Washington, Austin, and Fort Bend Counties. In this report a delineation as far downdip as possible has been made of the Jasper from the Sabine River to the Rio Grande.

The configuration of the Jasper aquifer in the subsurface as shown on the sections is geometrically irregular. This irregularity is due to the fact that the delineation was necessarily made on the basis of the aquifer being a rock stratigraphic unit. The hydrologic boundaries were defined by observable physical (lithologic) features rather than by inferred geologic history.

The configuration of the base and top of the Jasper transgresses stratigraphic boundaries along strike and downdip. The lower boundary of the aquifer coincides with the stratigraphic lower boundary of the Oakville or Fleming in some places. In other places the base of the Jasper lies within the Catahoula or coincides with the base of that unit. The top of the aquifer is within the Fleming Formation in places, follows the top of the Oakville Sandstone in other places, and is within the Oakville in still other places.

The Jasper ranges in thickness from as little as 200 feet (61 m) to about 3 200 feet (975 m). The maximum thickness occurs within the region of highly

saline water in the aquifer. An average range in thickness of the aquifer within the zone of fresh to slightly saline water is from about 600 to 1 000 feet (183 to 305 m). In the eastern part of the Coastal Plain of Texas the Jasper contains a greater percentage of sand than in the southern part. At the Sabine River the Jasper attains a thickness of 2 400 feet (732 m) in well 31 on section L L (Figure 15) where the aquifer is composed almost entirely of sand. Fresh to slightly saline water as shown on section D D (Figure 5) occurs as deep as 3 000 feet (914 m) below sea level.

Delineation of the Jasper aquifer in Louisiana (Whitfield 1975) in western Louisiana and eastern Texas (Turcan, Wesselman, and Kilburn 1966) and in Jasper and Newton Counties, Texas (Wesselman 1967) shows that the thickness of the Jasper at the Sabine River closely approximates that given by the author. For example, the author assigns a thickness of 2 400 feet (732 m) to the Jasper in well 31 on section L L (Figure 15) and the authors cited above show essentially the same thickness at the site. This agreement in aquifer thickness, however, is contrasted to different interpretations of the stratigraphic composition or age of the aquifer near the Sabine River. The authors cited above restrict the Jasper to a part of the Fleming Formation, whereas this paper redefines the Jasper at its type locality near the Sabine River to include the upper part of the Catahoula of Texas in addition to the lower part of the Fleming of Texas. (This redefinition applies only to the area of the type locality and is thus only locally valid. Elsewhere in the Coastal Plain of Texas the Jasper assumes a different stratigraphic makeup.)

The stratigraphic discrepancies at the Texas-Louisiana border are attributed to different interpretations of the surface geology at the State line. The Palestine quadrangle of the Geologic Atlas of Texas (Barnes 1968b) shows the Catahoula outcrop to be about 6 miles (9.7 km) wide at the Sabine River, whereas Welch (1942) shows the outcrop in Louisiana to be about 1 mile (1.6 km) wide. A close comparison of the two geologic maps indicates that in Louisiana the Lena, Carnahan Bayou, and at least part of the Dough Hills Members of Fisk (1940) of the Fleming Formation of Kennedy (1892) in addition to the Catahoula of Welch (1942) are equivalent to the Catahoula of Texas. Wesselman (1967) assigned the Carnahan Bayou Member as the basal part of the Jasper, which is reasonable, but this member is Catahoula in age in Texas. As long as the discrepancy in geologic mapping is unresolved,

subsurface correlations of the Catahoula Fleming contact as well as formation thicknesses will continue to differ

Burkeville Confining System

The Burkeville confining system which was named by Wesselman (1967) for outcrops near the town of Burkeville in Newton County Texas is delineated on the sections from the Sabine River to near the Rio Grande. It separates the Jasper and Evangeline aquifers and serves to retard the interchange of water between the two aquifers.

The Burkeville has been mapped in this report as a rock stratigraphic unit consisting predominantly of silt and clay. Boundaries were determined independently from time concepts although in some places the unit appears to possess approximately isochronous boundaries. In most places however this is not the case. For example the entire thickness of sediment in the Burkeville confining system in some areas is younger than the entire thickness of sediment in the Burkeville in other places.

The configuration of the unit is highly irregular. Boundaries are not restricted to a single stratigraphic unit but transgress the Fleming Oakville contact in many places. This is shown on sections D D to G G and J J (Figures 5 8 and 11). Where the Oakville Sandstone is present the Burkeville crops out in the Fleming but dips gradually into the Oakville because of facies changes from sand to clay downward.

The typical thickness of the Burkeville ranges from about 300 to 500 feet (91 to 152 m). However thick sections of predominantly clay in Jackson and Calhoun Counties account for the Burkeville's gradual increase to its maximum thickness of more than 2 000 feet (610 m) as shown on section F F (Figure 7).

The Burkeville confining system should not be construed as a rock unit that is composed entirely of silt and clay. This is not typical of the unit although examples of a predominance of silt and clay can be seen in some logs in sections H H and I I (Figures 9-10). In most places the Burkeville is composed of many individual sand layers which contain fresh to slightly saline water but because of its relatively large percentage of silt and clay when compared to the underlying Jasper aquifer and overlying Evangeline the Burkeville functions as a confining unit.

Evangeline Aquifer

The Evangeline aquifer which was named and defined by Jones (Jones Turcan and Skibitzke 1954) for a ground water reservoir in southwestern Louisiana has been mapped also in Texas but heretofore has been delineated no farther west than Washington Austin Fort Bend and Brazoria Counties. Its presence as an aquifer and its hydrologic boundaries to the west have been a matter of speculation. D G Jorgensen W R Meyer and W H Sandeen of the U S Geological Survey (written commun March 1 1976) recently refined the delineation of the aquifer in previously mapped areas and continued its delineation to the Rio Grande. The boundaries of the Evangeline as they appear on the sections in this report are their determinations.

The Evangeline aquifer has been delineated in this report essentially as a rock stratigraphic unit. Although the aquifer is composed of at least the Goliad Sand the lower boundary transgresses time lines to include sections of sand in the Fleming Formation. The base of the Goliad Sand at the outcrop coincides with the base of the Evangeline only in South Texas as shown in sections H H to K K (Figures 9 12). Elsewhere the Evangeline at the surface includes about half of the Fleming outcrop. The upper boundary of the Evangeline probably follows closely the top of the Goliad Sand where present although this relationship is somewhat speculative.

The Evangeline aquifer is typically wedge shaped and has a high sand clay ratio. Individual sand beds are characteristically tens of feet thick. Near the outcrop the aquifer ranges in thickness from 400 to 1 000 feet (122 to 305 m) but near the coastline where the top of the aquifer is about 1 000 feet (305 m) deep its thickness averages about 2 000 feet (610 m). The Evangeline is noted for its abundance of good quality ground water and is considered one of the most prolific aquifers in the Texas Coastal Plain. Fresh to slightly saline water in the aquifer however is shown to extend to the coastline only in section J J (Figure 11).

Chicot Aquifer

The Chicot aquifer which was named and defined by Jones (Jones Turcan and Skibitzke 1954) for a ground water reservoir in southwestern Louisiana is the youngest aquifer in the Coastal Plain of Texas. Over the years the aquifer gradually was mapped westward from Louisiana into Texas where heretofore it is most

western limit was Austin Fort Bend and Brazoria Counties In this report the delineation of the Chicot was refined in previously mapped areas and extended to near the Rio Grande by D G Jorgensen W R Meyer and W M Sandeen of the U S Geological Survey (written commun March 1 1976)

It is believed that the base of the Chicot in some areas has been delineated on the sections in this report as the base of the Pleistocene Early work in Southeast Texas indicates that the Chicot probably comprises the Willis Sand Bentley Formation Montgomery Formation and Beaumont Clay of Pleistocene age and any overlying Holocene alluvium (Table 1) The problem that arises in this regard is that the base of the Pleistocene is difficult to pick from electrical logs Thus any delineation of the base of the Chicot in the subsurface as the base of the Pleistocene is automatically suspect At the surface the base of the Chicot on the

sections has been picked at the most landward edge of the oldest undissected coastwise terrace of Quaternary age In practice the delineation of the Chicot in the subsurface at least on the sections in Southeast Texas has been based on the presence of a higher sand clay ratio in the Chicot than in the underlying Evangeline In some places a prominent clay layer was used as the boundary Differences in hydraulic conductivity or water levels in some areas also served to differentiate the Chicot from the Evangeline

The high percentage of sand in the Chicot in Southeast Texas where the aquifer is noted for its abundance of water diminishes southwestward Southwest of section G G (Figure 8) the higher clay content of the Chicot and the absence of fresh to slightly saline water in the unit is sharply contrasted with the underlying Evangeline aquifer that still retains relatively large amounts of sand and good quality water

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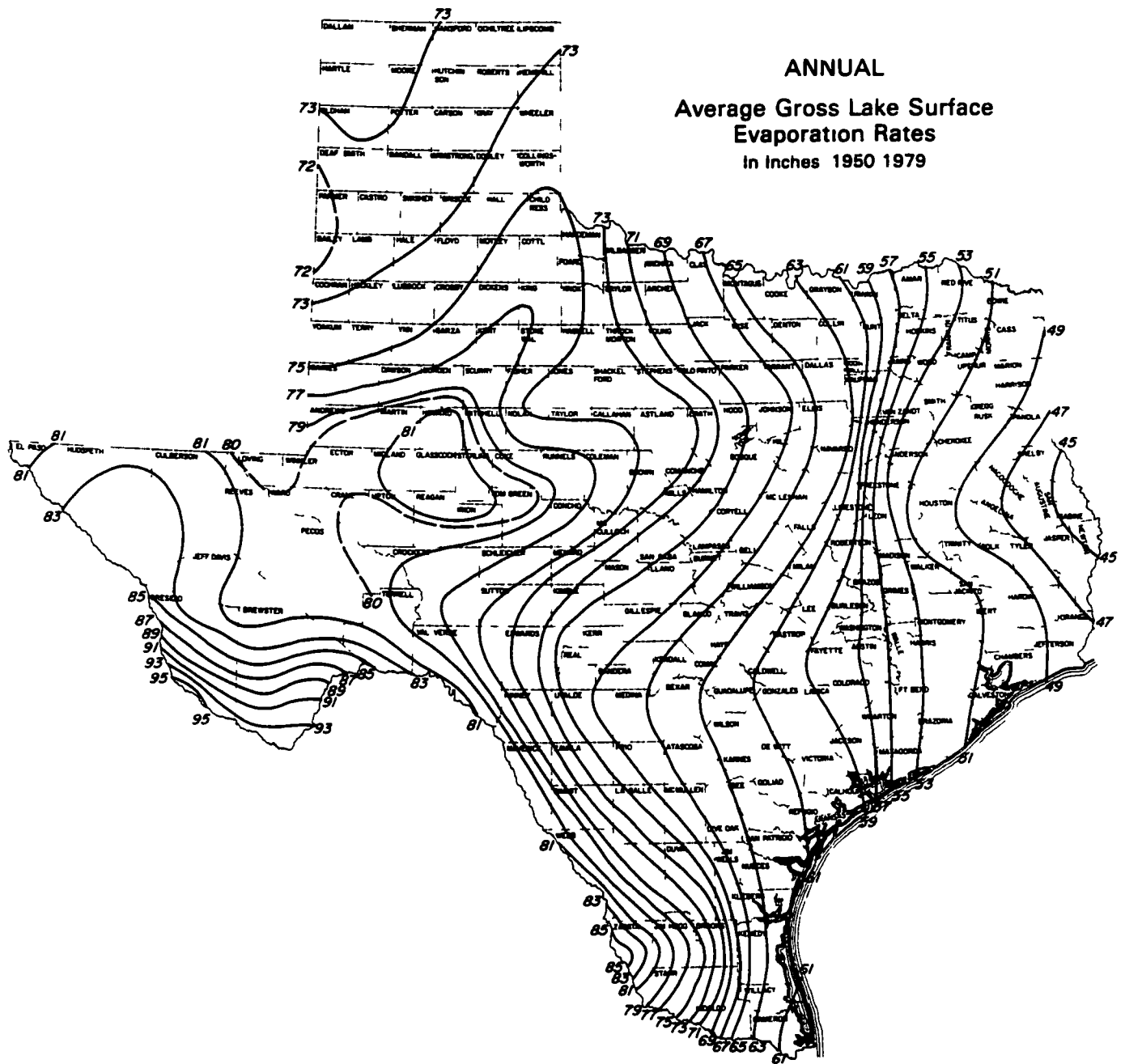
Climatic Atlas of Texas



LP 192

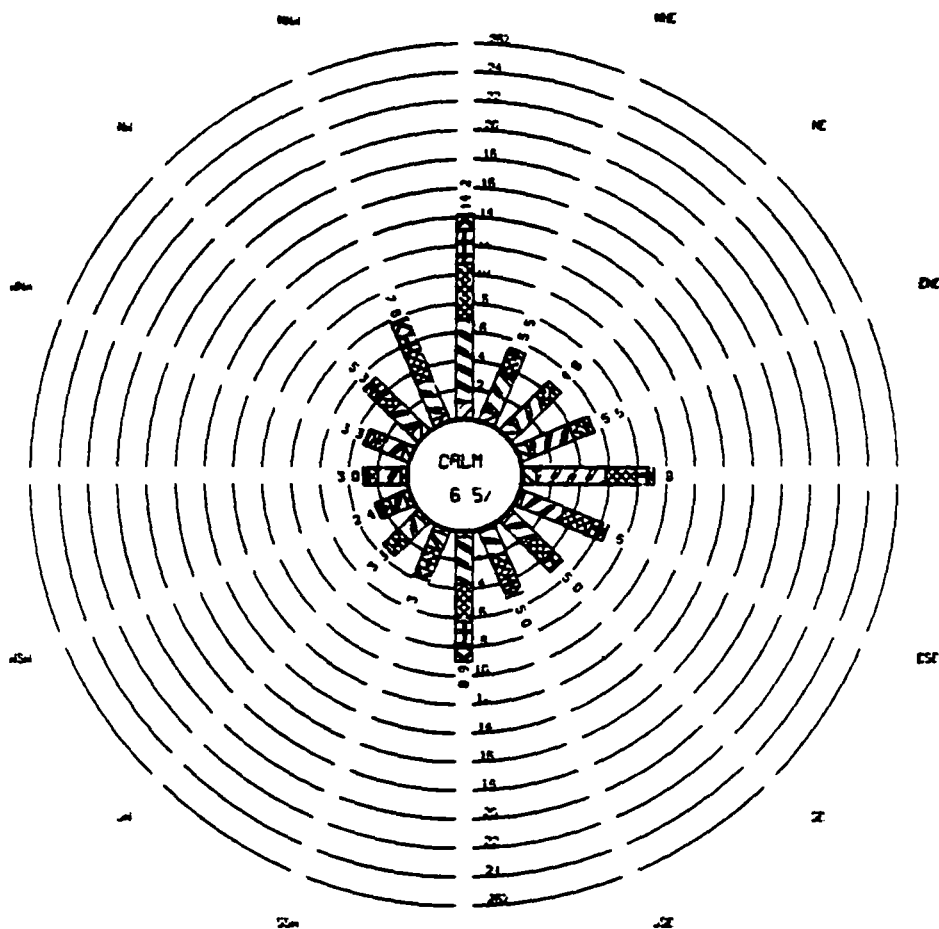
TEXAS DEPARTMENT OF WATER RESOURCES

DECEMBER 1983



WIND ROSES

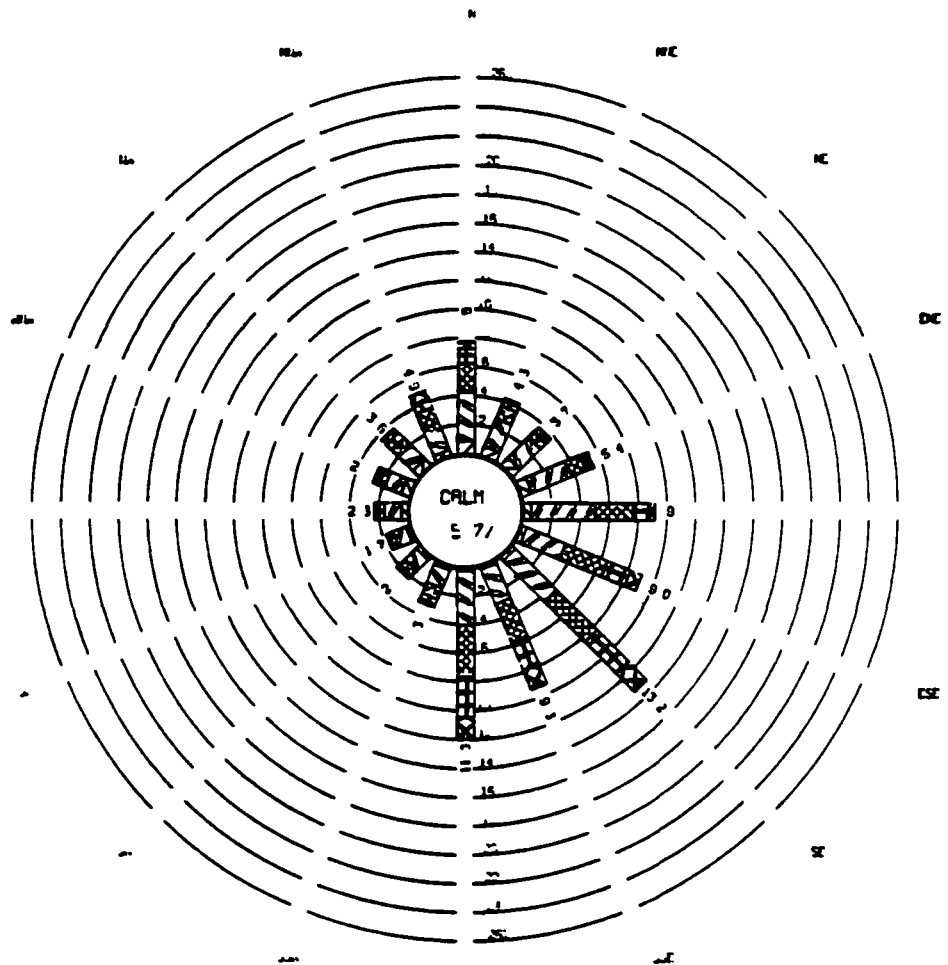
HOUSTON INTERCONTINENTAL AP
STATION #12960



LEGEND
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 4 KTS - 7 KTS
 8 KTS - 10 KTS
 11 KTS - 13 KTS
 14 KTS - 18 KTS
 ABOVE 18 KTS

PERIOD OF REPORT
 YEAR(S) ANALYZED 1971 -- 1990
 MONTHS DEC -- FEB
 HOURS OF DAY 0000 - 2300

HOLSTON INTERCONTINENTAL AP STATION -12960



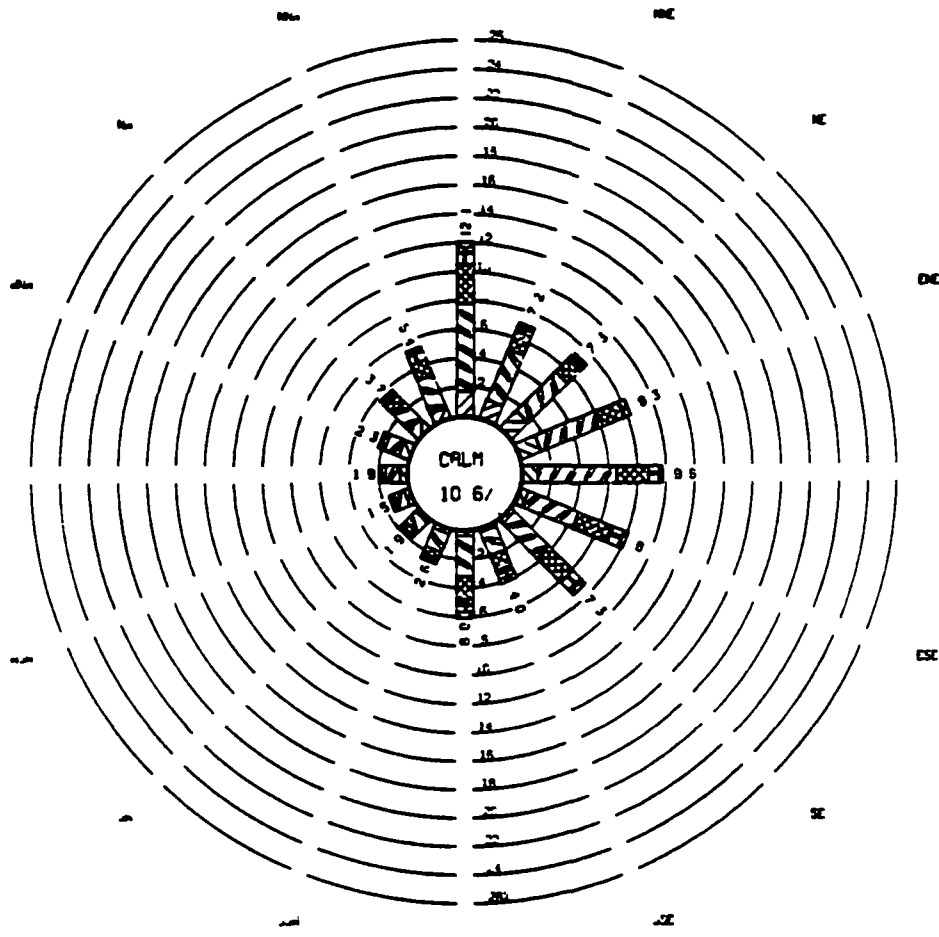
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811-000 11/30/80 1000 24.4 25.4 26.4 27.4 28.4 29.4 30.4 31.4 32.4 33.4 34.4 35.4 36.4 37.4 38.4 39.4 40.4 41.4 42.4 43.4 44.4 45.4 46.4 47.4 48.4 49.4 50.4 51.4 52.4 53.4 54.4 55.4 56.4 57.4 58.4 59.4 60.4 61.4 62.4 63.4 64.4 65.4 66.4 67.4 68.4 69.4 70.4 71.4 72.4 73.4 74.4 75.4 76.4 77.4 78.4 79.4 80.4 81.4 82.4 83.4 84.4 85.4 86.4 87.4 88.4 89.4 90.4 91.4 92.4 93.4 94.4 95.4 96.4 97.4 98.4 99.4 100.4 101.4 102.4 103.4 104.4 105.4 106.4 107.4 108.4 109.4 110.4 111.4 112.4 113.4 114.4 115.4 116.4 117.4 118.4 119.4 120.4 121.4 122.4 123.4 124.4 125.4 126.4 127.4 128.4 129.4 130.4 131.4 132.4 133.4 134.4 135.4 136.4 137.4 138.4 139.4 140.4 141.4 142.4 143.4 144.4 145.4 146.4 147.4 148.4 149.4 150.4 151.4 152.4 153.4 154.4 155.4 156.4 157.4 158.4 159.4 160.4 161.4 162.4 163.4 164.4 165.4 166.4 167.4 168.4 169.4 170.4 171.4 172.4 173.4 174.4 175.4 176.4 177.4 178.4 179.4 180.4 181.4 182.4 183.4 184.4 185.4 186.4 187.4 188.4 189.4 190.4 191.4 192.4 193.4 194.4 195.4 196.4 197.4 198.4 199.4 200.4 201.4 202.4 203.4 204.4 205.4 206.4 207.4 208.4 209.4 210.4 211.4 212.4 213.4 214.4 215.4 216.4 217.4 218.4 219.4 220.4 221.4 222.4 223.4 224.4 225.4 226.4 227.4 228.4 229.4 230.4 231.4 232.4 233.4 234.4 235.4 236.4 237.4 238.4 239.4 240.4 241.4 242.4 243.4 244.4 245.4 246.4 247.4 248.4 249.4 250.4 251.4 252.4 253.4 254.4 255.4 256.4 257.4 258.4 259.4 260.4 261.4 262.4 263.4 264.4 265.4 266.4 267.4 268.4 269.4 270.4 271.4 272.4 273.4 274.4 275.4 276.4 277.4 278.4 279.4 280.4 281.4 282.4 283.4 284.4 285.4 286.4 287.4 288.4 289.4 290.4 291.4 292.4 293.4 294.4 295.4 296.4 297.4 298.4 299.4 300.4 301.4 302.4 303.4 304.4 305.4 306.4 307.4 308.4 309.4 310.4 311.4 312.4 313.4 314.4 315.4 316.4 317.4 318.4 319.4 320.4 321.4 322.4 323.4 324.4 325.4 326.4 327.4 328.4 329.4 330.4 331.4 332.4 333.4 334.4 335.4 336.4 337.4 338.4 339.4 340.4 341.4 342.4 343.4 344.4 345.4 346.4 347.4 348.4 349.4 350.4 351.4 352.4 353.4 354.4 355.4 356.4 357.4 358.4 359.4 360.4 361.4 362.4 363.4 364.4 365.4 366.4 367.4 368.4 369.4 370.4 371.4 372.4 373.4 374.4 375.4 376.4 377.4 378.4 379.4 380.4 381.4 382.4 383.4 384.4 385.4 386.4 387.4 388.4 389.4 390.4 391.4 392.4 393.4 394.4 395.4 396.4 397.4 398.4 399.4 400.4 401.4 402.4 403.4 404.4 405.4 406.4 407.4 408.4 409.4 410.4 411.4 412.4 413.4 414.4 415.4 416.4 417.4 418.4 419.4 420.4 421.4 422.4 423.4 424.4 425.4 426.4 427.4 428.4 429.4 430.4 431.4 432.4 433.4 434.4 435.4 436.4 437.4 438.4 439.4 440.4 441.4 442.4 443.4 444.4 445.4 446.4 447.4 448.4 449.4 450.4 451.4 452.4 453.4 454.4 455.4 456.4 457.4 458.4 459.4 460.4 461.4 462.4 463.4 464.4 465.4 466.4 467.4 468.4 469.4 470.4 471.4 472.4 473.4 474.4 475.4 476.4 477.4 478.4 479.4 480.4 481.4 482.4 483.4 484.4 485.4 486.4 487.4 488.4 489.4 490.4 491.4 492.4 493.4 494.4 495.4 496.4 497.4 498.4 499.4 500.4 501.4 502.4 503.4 504.4 505.4 506.4 507.4 508.4 509.4 510.4 511.4 512.4 513.4 514.4 515.4 516.4 517.4 518.4 519.4 520.4 521.4 522.4 523.4 524.4 525.4 526.4 527.4 528.4 529.4 530.4 531.4 532.4 533.4 534.4 535.4 536.4 537.4 538.4 539.4 540.4 541.4 542.4 543.4 544.4 545.4 546.4 547.4 548.4 549.4 550.4 551.4 552.4 553.4 554.4 555.4 556.4 557.4 558.4 559.4 560.4 561.4 562.4 563.4 564.4 565.4 566.4 567.4 568.4 569.4 570.4 571.4 572.4 573.4 574.4 575.4 576.4 577.4 578.4 579.4 580.4 581.4 582.4 583.4 584.4 585.4 586.4 587.4 588.4 589.4 590.4 591.4 592.4 593.4 594.4 595.4 596.4 597.4 598.4 599.4 600.4 601.4 602.4 603.4 604.4 605.4 606.4 607.4 608.4 609.4 610.4 611.4 612.4 613.4 614.4 615.4 616.4 617.4 618.4 619.4 620.4 621.4 622.4 623.4 624.4 625.4 626.4 627.4 628.4 629.4 630.4 631.4 632.4 633.4 634.4 635.4 636.4 637.4 638.4 639.4 640.4 641.4 642.4 643.4 644.4 645.4 646.4 647.4 648.4 649.4 650.4 651.4 652.4 653.4 654.4 655.4 656.4 657.4 658.4 659.4 660.4 661.4 662.4 663.4 664.4 665.4 666.4 667.4 668.4 669.4 670.4 671.4 672.4 673.4 674.4 675.4 676.4

HOUSTON INTERCONTIN. --- STATION #12960



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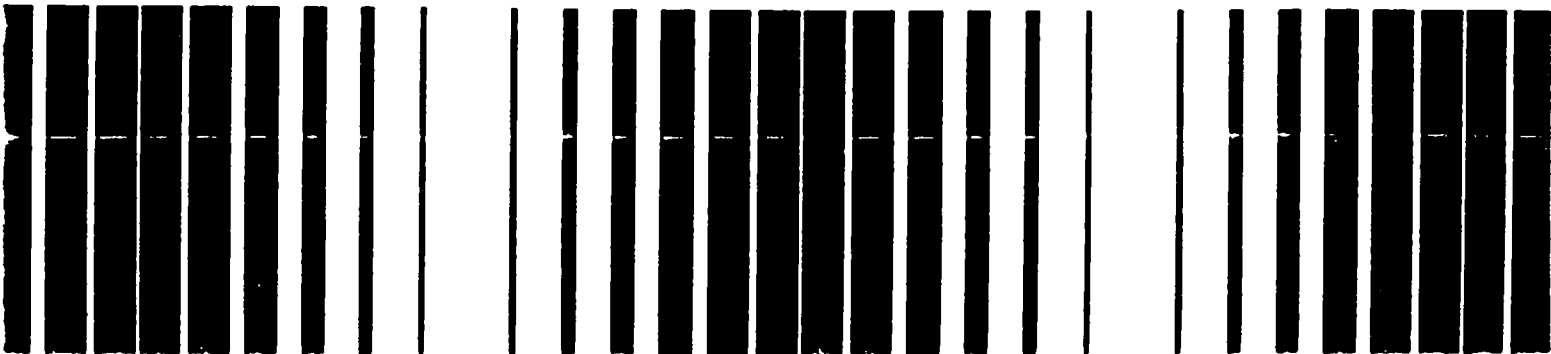
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YEAR(S) ANALYZED 1971 -- 1980
MONTHS SEPT -- NOV
HOURS OF DAY 0000 -- 2300

REFERENCE 22



Handbook

Ground Water



Handbook

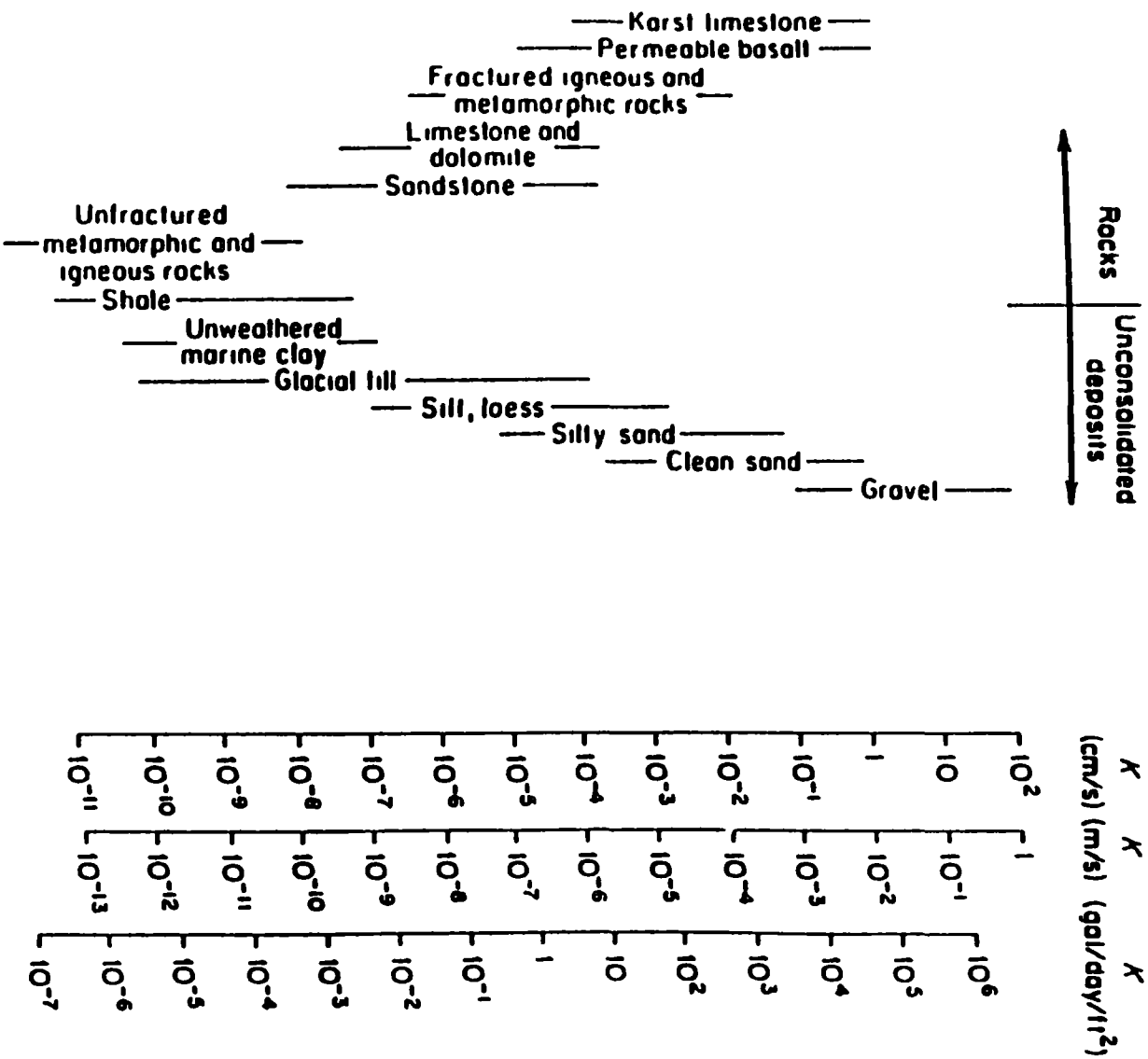
Ground Water

**U S Environmental Protection Agency
Office of Research and Development**

**Center for Environmental Research Information
Cincinnati, OH 45268**

**Robert S Kerr Environmental Research Laboratory
Ada, Oklahoma 74820**

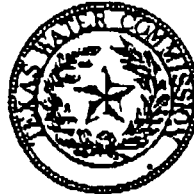
Table 1-3 Range of Values of Hydraulic Conductivity (adapted from Freeze and Cherry 1978)



REFERENCE 23

CITY OF HOUSTON

(A PUBLIC WATER SUPPLY PROTECTION STRATEGY)



Brad L. Cross
Geologist
Texas Water Commission
(512) 475-4594

David P. Terry, M. En.
Environmental Scientist
Texas Water Commission

→ Steve -

Brad knows
the requirements +
limitations for
a Well Head
Protection Area
(WHPA). Give him
a call if you have
any questions.

and

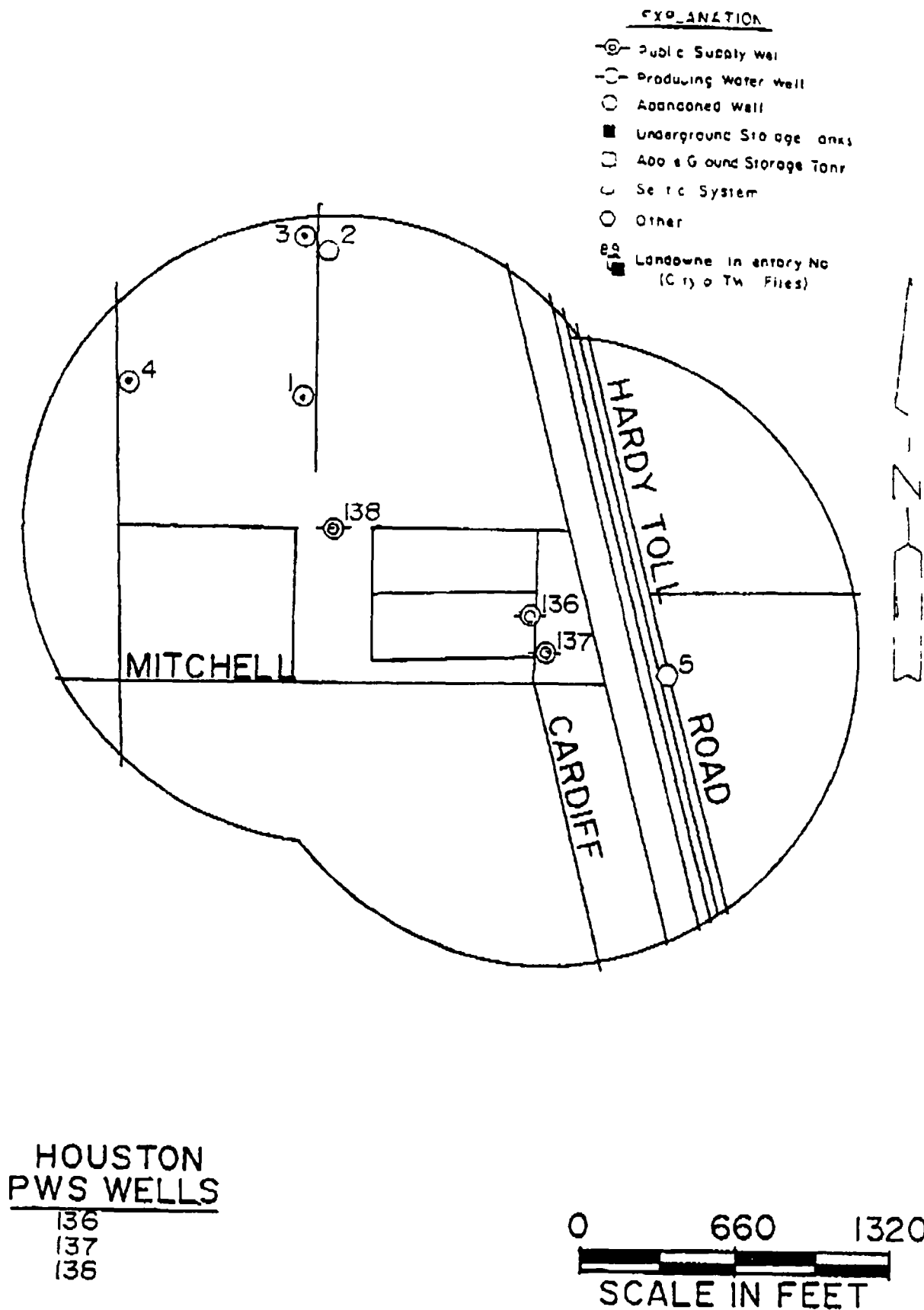
Valerie R. Billings, P.E.
Texas Department of Health

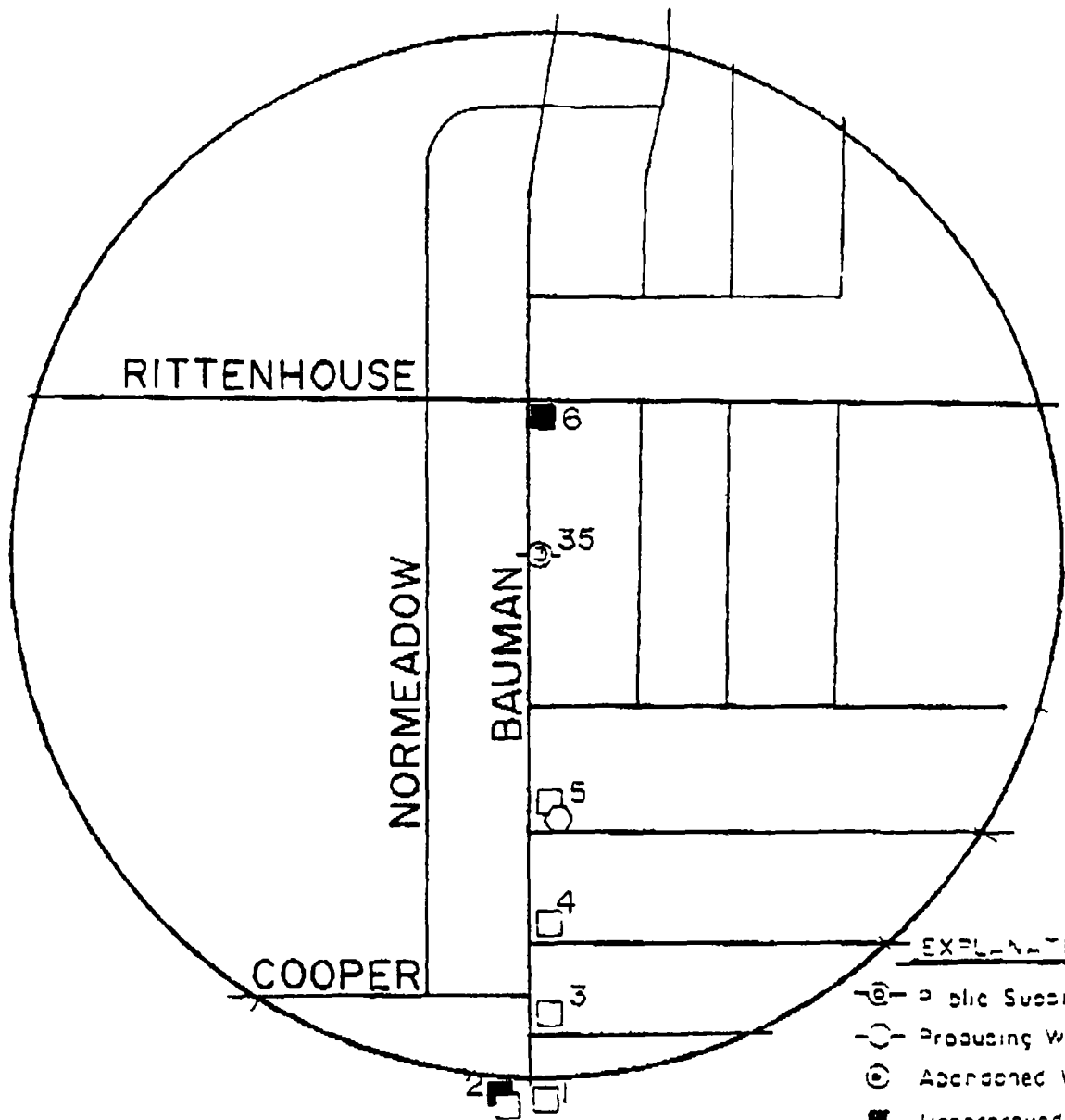
Post It™ brand fax transmittal memo 7671		# of pages •
To Steve Hamm	From Ann Strahl	
Co TWC Dist 7	Co TWC - Austin	
Dept	Phone # 512-908-2521	
Fax # 713	Fax # 512-908-2527	

July 1991

Mike Williams

214 555-7447





Houston PWS Well(s)
Included in this Map

35

0 660 1320
Scale in Feet

REFERENCE 24

W E S T O N
PHONE CONVERSATION RECORD

CONVERSATION WITH

DATE 7 July 1993

NAME Tom

TIME 2 40 PM

COMPANY Harris County Subsidence District (HCSD)

X ORIGINATOR PLACED CALL

ADDRESS

ORIGINATOR RECEIVED CALL

PHONE (713) 486-1105

W O NO 04603-022-034-2400

SUBJECT City of Houston Public Supply Wells

NOTES

I asked Tom about the three public supply wells (Well No 136, 137, 138) and the abandoned wells (Well No 1, 2, 3, and 4) that are shown on figures provided to me by the Texas Water Commission (TWC) Tom stated that these public supply wells are active and can, in addition to the water obtained from nearby surface water bodies (i e , Lake Houston), provide drinking or bathing water for individuals

Tom could not verify the identity of these wells since the TWC, Texas Water Development Board, and the HCSD use different numbering systems

Tom also could not verify that the abandoned wells had been decommissioned or plugged

FILE 17 24

TICKLE FILE

FOLLOW UP-BY

COPY/ROUTE TO JSW

FOLLOW UP ACTION

a \inform\hcsd con

REFERENCE 25

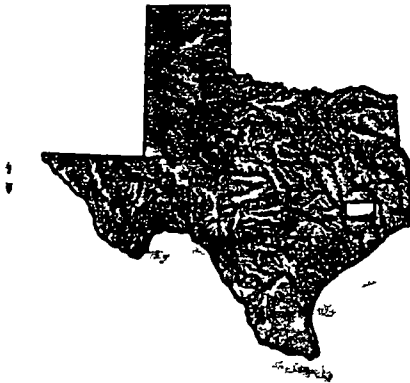
PA

30095-A1-TM 100

Conroe

TEXAS

1 100 000-scale *metric*
topographic map



**30 X 60 MINUTE QUADRANGLE
SHOWING**

- Contours and elevations
in meters
- Highways, roads and other
manmade structures
- Water features
- Woodland areas
- Geographic names



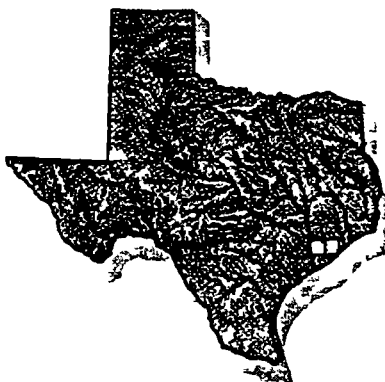
GEOLOGICAL SURVEY

1985

Houston

TEXAS

1 100 000-scale *metric*
topographic map



**30 X 60 MINUTE QUADRANGLE
SHOWING**

- Contours and elevations
in meters
- Highways, roads and other
manmade structures
- Water features
- Woodland areas
- Geographic names



GEOLOGICAL SURVEY

1992

REFERENCE 26

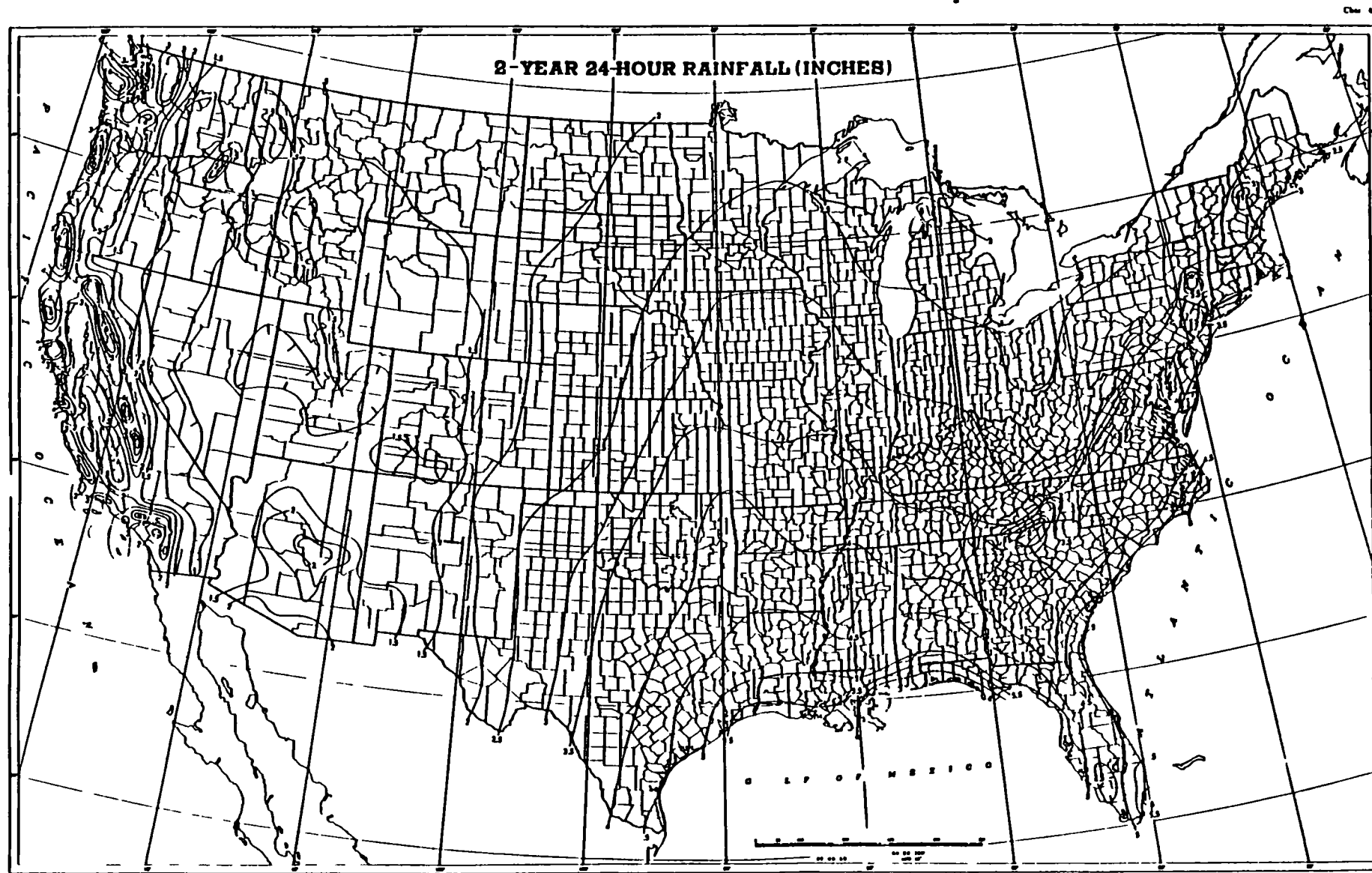


Figure 3-9 Twenty Four-Hour Rainfall Depths Taken from USDC, 1961

REFERENCE 27

T/4 + E 51

REFERENCE 28

HARRIS COUNTY

<u>Status</u>	<u>Common Name</u>	<u>Scientific Name</u>
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LISTED SPECIES

Plants

E	Prairie dawn	<u>Hymenoxys texana</u>
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Amphibians

E	Houston toad (H)	<u>Bufo houstonensis</u>
---	------------------	--------------------------

Birds

T	Arctic peregrine falcon (M)	<u>Falco peregrinus tundrius</u>
E	Bald eagle (N)	<u>Haliaeetus leucocephalus</u>
E	Red-cockaded woodpecker (P)	<u>Picoides borealis</u>

CANDIDATE SPECIES

Plants

C2	Texas windmill-grass	<u>Chloris texensis</u>
C2	Golden wave tickseed	<u>Coreopsis intermedia</u>
C2	Houston machaeranthera	<u>Machaeranthera aurea</u>
C2	Houston meadow-rue	<u>Thalictrum texanum</u>

Reptiles

C2	Alligator snapping turtle	<u>Macrochelys temminckii</u>
C2	Texas diamondback terrapin	<u>Malaclemys terrapin littoralis</u>
C2	Texas horned lizard	<u>Phrynosoma cornutum</u>

Birds

C2	Bachman's sparrow	<u>Aimophila aestivalis</u>
C2	Henslow's sparrow	<u>Ammodramus henslowii</u>
C2	Long-billed curlew	<u>Numenius americanus</u>
C2	Reddish egret	<u>Egretta rufescens</u>
C2	White-faced ibis	<u>Plegadis chihi</u>

Mammals

C2	Big Thicket hog-nosed skunk	<u>Conepatus mesoleucus</u> <u>telmalestes</u>
C2	Plains spotted skunk	<u>Spilogale putorius interrupta</u>

E= Endangered
T= Threatened
C2= Candidate with some information on hand for listing
H= Historical occurrence
M= Migrant only
N= Nesting activity
P= Potential resident (if habitat exists)

May 1, 1992

Common Name:

Prairie dawn



Paul Montgomery

RANGE:

Found in coastal prairie habitat in:

FORT BEND, HARRIS Counties

(historical collection from La Salle County)

Scientific name *Hymenoxys texana* (Coulter & Rose) Cockerell

Other Scientific Names *Actinella texana* Coulter & Rose *Picradenia texana* (Coulter & Rose) Greene

Federal Status Listed as Endangered, March 13, 1985

State Status Listed as Endangered, January 23, 1987

Photographs and Drawings None easily obtainable

Description:

Habit Small delicate annual to 6 in. tall, stems single or branching

Leaves. Those clustered at the plant base, spoon-shaped, with entire or toothed margins, about $\frac{1}{4}$ in. wide, those along the stem, alternate, fewer narrower, with parallel sides, few or no teeth along the margins

Flowers. Yellow, small, inconspicuous on stems $\frac{1}{16}$ - $\frac{1}{8}$ in. long, phyllaries in two series joined at the base rigid and keeled, about $\frac{1}{16}$ in. long, ray flowers ("petals") minute, appearing to be absent, disc flowers ("center") tubular, minutely toothed at top, less than $\frac{1}{8}$ in. long, pappus of 5 scales tipped with short awns $\frac{1}{2}$ - $\frac{3}{4}$ in. long, flowering late March to early April

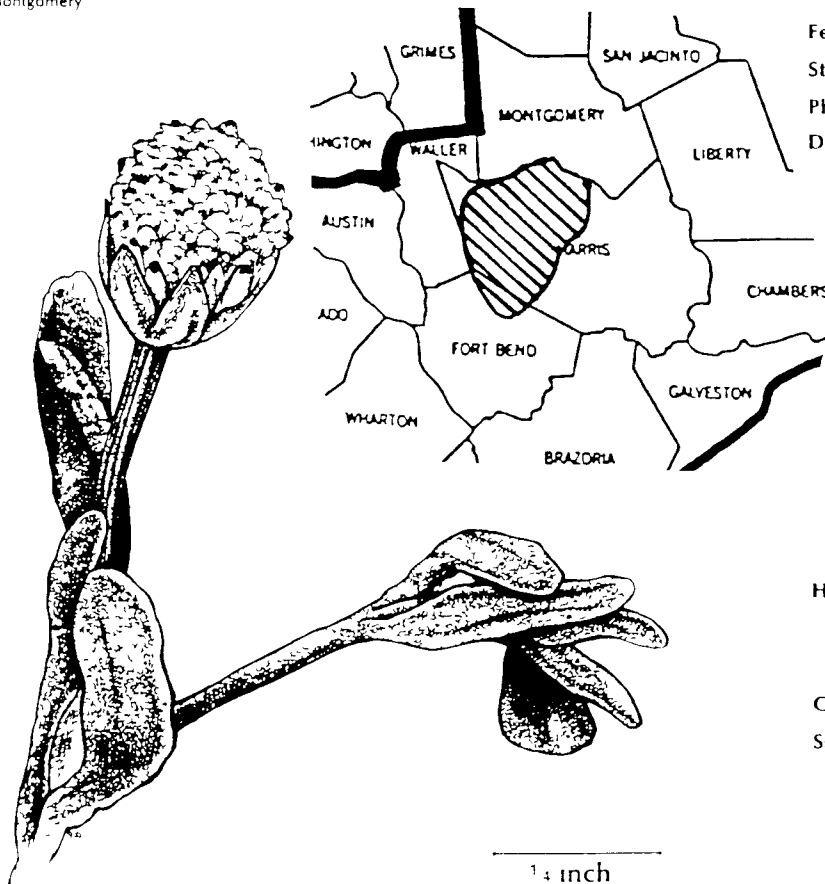
Fruit "Seeds" cone-shaped, obscurely 4-angled hairy, $\frac{1}{16}$ - $\frac{1}{8}$ in. long, maturing April to May

Habitat In poorly drained depressions or at the base of mima mounds in open grassland in almost barren areas with *Limnoscadium pumilum*, peppergrass, little barley, and Nostoc

Ownership Private and public land

Similar Species with Key Character Differences

Ray flower ("petals") present *Hymenoxys*
(other Texas species), *Helenium*, *Diossodia*



Leaves and flower of
Prairie dawn

STATUS Endangered (35 FR 16047 October 13 1970) with critical habitat (43 FR 4022 January 31 1978)

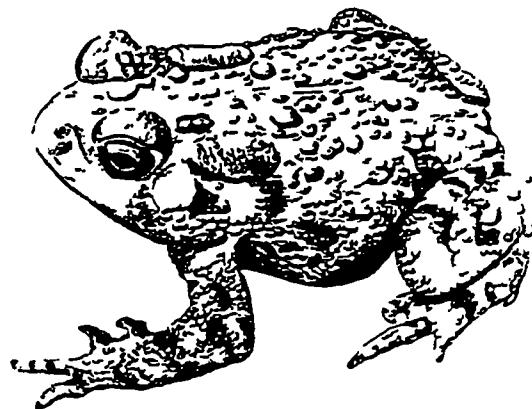
CRITICAL HABITAT Texas Areas of land water and air space as follows (1) in Bastrop County from the junction of a line corresponding to 30°12 00 N and Texas State Highway 95 east along a line corresponding to 30°12 00 N to where it intersects a line corresponding to 97°7 30 W and south along a line corresponding to 97°7 30 W to where it intersects the Colorado River west and northwest along the north bank of the Colorado River to the due southward extension of Texas State Highway 95 and north along that extension and Texas State Highway 95 to where it intersects a line corresponding to 30°12 00 N and (2) Burleson County a circular area with a 1 mile radius the center being the north entrance to Lake Woodrow from Texas FM 2000

DESCRIPTION A small (2 3 25 inches long) toad similar in appearance to the American toad General coloration varies from light brown to gray or purplish gray sometimes with green patches Pale ventral surfaces often have small dark spots Males have dark throat

HABITAT Requires deep sand or loamy sands for burrows/aestivation and breeds in ephemeral rain pools flooded fields and permanent ponds Males call from shallow water or small mounds of soil or grass surrounded by water Males also call from woods in wooded habitat within 100 m radius of breeding sites Pairs sometimes come to breeding sites already in amplexus (copulatory embrace of frogs and toads)

DISTRIBUTION

Present Austin Bastrop Burleson Colorado Freestone Lavaca Lee (presumed but not confirmed) Leon Milam and Robertson Counties in Texas (Freestone Lavaca Leon Milam and Robertson Counties are relatively new records)



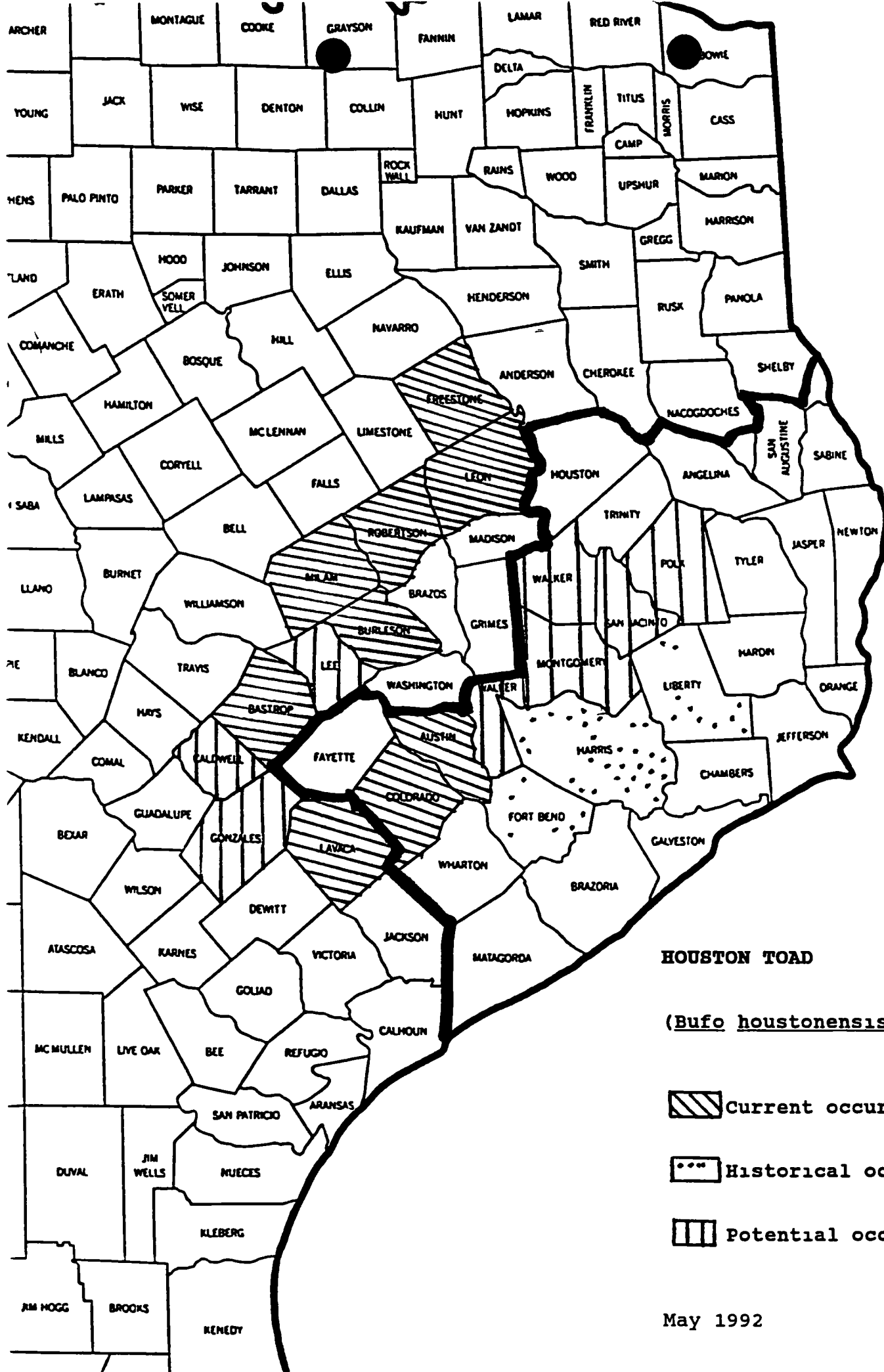
Historic Austin Bastrop Burleson Colorado Fort Bend Harris and Liberty Counties

THREATS AND/OR REASONS FOR DECLINE Habitat degradation/destruction caused by land use changes including agricultural and urban expansion reduction of suitable habitat by watershed alteration and failure to reproduce and survive during drought

OTHER INFORMATION Recovery plan completed in 1984 Majority of diet is insects and other invertebrates Breeds from January to June followed by aestivation until the next spring rains Toads will only emerge to breed if conditions are adequate Toads especially first year toadlets and juveniles are active year round under suitable conditions Non flowing pools that persist for at least 30 days are needed for breeding including egg and tadpole life stages Toads may emerge outside of the breeding season Recovery Plan undergoing revision




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HOUSTON TOAD

(Bufo houstonensis)

-  Current occurrence
-  Historical occurrence
-  Potential occurrence?

May 1992

STATUS Threatened (35 FR 16047 October 13 1970 35 FR 8495 June 2 1970 49 FR 10526 March 20 1984) without critical habitat

DESCRIPTION Arctic peregrine falcons are slaty gray above and whitish below and have a black head with vertical bandit s mask pattern over the eyes This falcon can be distinguished from the American peregrine falcon by its smaller size and lighter coloration They are very adept and exceedingly fast flyers reaching speeds of more than 200 mph in dives The dark brown or blue gray backs of peregrines distinguish them from the sandy brown prairie falcon

HABITAT Nests in the Arctic tundra Winters in the United States Central and South America especially along coastlines and in mountains

DISTRIBUTION

Present Occurs statewide in Texas during the fall and spring migrations with a few wintering along the Texas Gulf Coast Concentrates in April and October on North and South Padre Islands

Historic Occurred statewide in Texas (during migration)

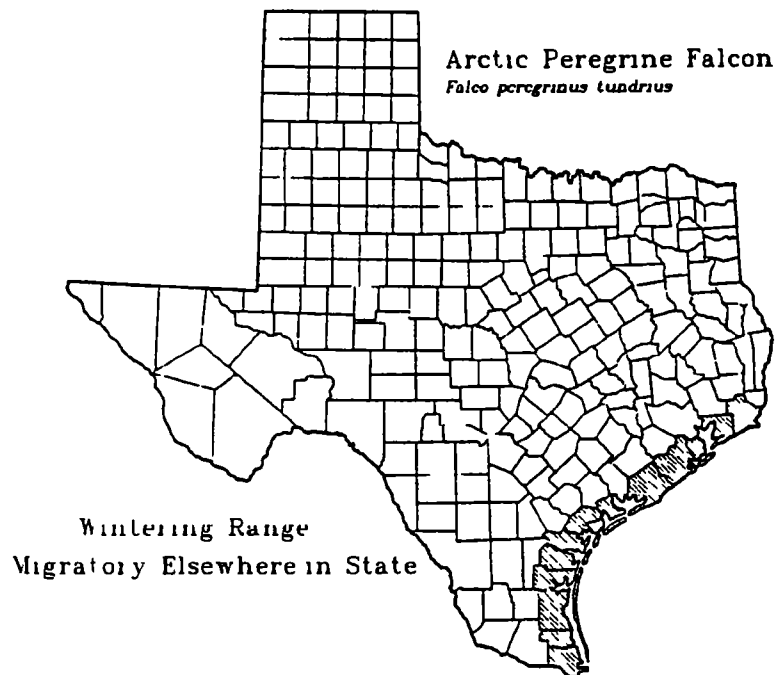
THREATS AND REASONS FOR DECLINE Reproductive failure due to pesticides

OTHER INFORMATION Population increases due to reduced contaminant levels resulted in downlisting to threatened status Alaska Recovery Plan approved and being implemented Padre Island appears to be an important staging area for migrating Arctic Peregrine Falcons in the spring

REFERENCES

Oberholser H C and E B Kincaid 1974 The Bird Life of Texas University of Texas Press Austin Texas
U S Fish & Wildlife Service (USFWS) 1982 Recovery Plan for the Peregrine Falcon Alaska Population USFWS
Endangered Species Office Anchorage AK

REV DATE 8/92



Map only shows Texas range

STATUS Listed as endangered (1967 1978) without critical habitat in all but five of the contiguous 48 states (listed as threatened in Washington Oregon Minnesota Wisconsin and Michigan) The Southeastern States Bald Eagle Recovery Plan was approved in 1983 and revised in 1989 Bald eagles are protected by a number of Federal and State laws including the Endangered Species Act Bald Eagle Protection Act and Migratory Bird Treaty Act

DESCRIPTION Large hawk like bird with a 6 7 feet wingspread adults have a white head neck and tail immatures are mostly dark and may be confused with golden eagles

THREATS AND/OR REASONS FOR DECLINE Past threats to the species include reproductive failure caused by certain pesticides loss of riparian habitat and unrestricted killing by humans (shooting poisoning and trapping) Current threats remain habitat loss and human encroachment on bald eagle nest sites Lead poisoning is also a concern even low levels can cause neurological dysfunction behavioral aberrations anemia and increased susceptibility to disease

HABITAT Preferred nesting habitat in Texas is along river systems or within 1 2 miles of some other large body of water such as a lake or reservoir Nests are often located in the ecotone (edge) between forest marsh and water Large tall (40 120 feet) trees are generally needed and nests are often constructed in the dominant or codominant trees of an area (taller than general forest canopy providing unobstructed flight path to nest) A variety of tree species are utilized for nesting In Texas eagles have constructed nests in loblolly pine baldcypress oak cottonwood and sycamore trees among others Nearby (within 0 5 miles) wetland areas are necessary for feeding Fish is generally the primary food but eagles in Texas also utilize waterfowl turtles small mammals and carrion

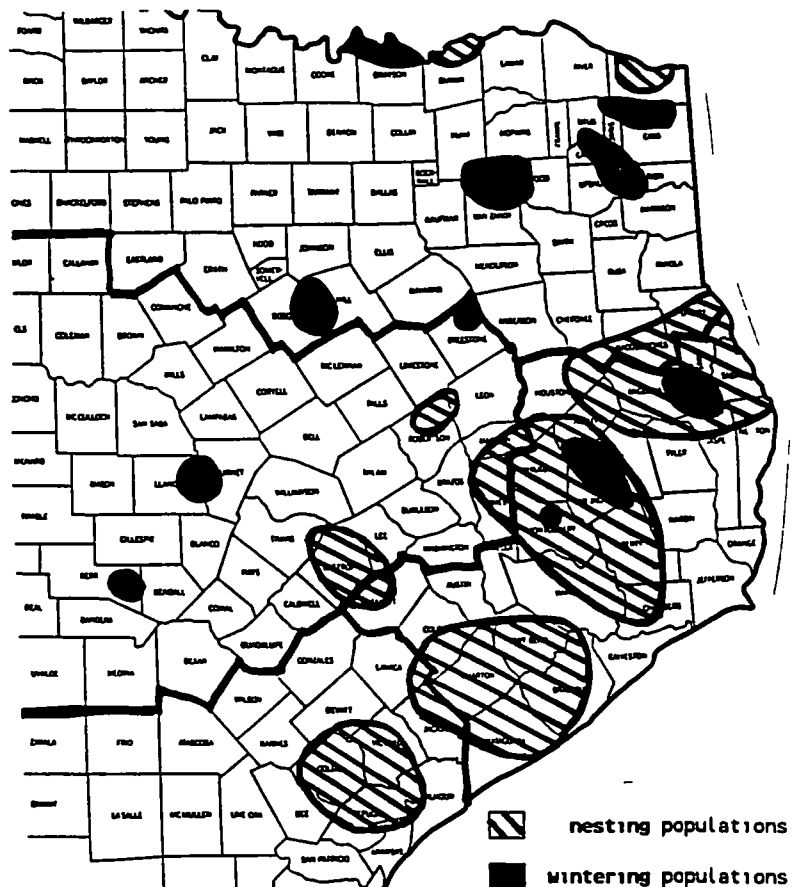
Bald eagles also occur in Texas as wintering individuals that migrate from areas north These eagles utilize major rivers reservoirs and other areas of open water where fish waterfowl and carrion are available for food

DISTRIBUTION

Nesting populations are gradually increasing in Texas In 1992 bald eagle nests were known to occur (although not all were active or successful) in Angelina Bastrop Bowie Brazoria Calhoun Chambers Colorado Fannin Fayette Fort Bend Goliad Grimes Harris Houston Jackson Liberty Matagorda Montgomery Polk Refugio Robertson Sabine San Augustine San Jacinto Shelby Trinity Victoria Walker and Wharton Counties

Wintering populations may occur statewide but they generally can be found from December to March around large water bodies such as the following Lake Meredith (Hutchinson Moore Potter Counties) Buffalo Lake (Randall County) Lake Texoma (Grayson County) Wright Patman Lake (Bowie County) Lake o' the Pines (Marion County) Lake Fork (Rains and Wood Counties) Lake Tawakoni (Hunt Rains Van Zandt Counties) Lake Whitney (Bosque and Hill Counties) Lake Fairfield (Freestone County) Toledo Bend Reservoir (Newton Panola Sabine Shelby Counties) Sam Rayburn Reservoir (Angelina Jasper Macogdoches Sabine San Augustine Counties) Lake Livingston (Polk San Jacinto Trinity Walker Counties) Lake Conroe (Montgomery and Walker Counties) and Lake Buchanan (Burnet and Llano Counties)

Bald eagles may also occur throughout state as spring and fall migrants



OTHER INFORMATION The bald eagle nesting period in Texas is normally October to July with peak egg laying in December and hatching primarily in January Young generally fledge in April after 10 12 weeks of growth but parental care continues for another 4 6 weeks Adults and young begin to migrate north in May with a pair sometimes remaining within a territory all year Adulthood is reached at 4 6 years of age Bald eagles are vulnerable to disturbance throughout the nesting period However habitat management guidelines that should minimize or avoid disturbance to nesting bald eagles have been developed and can be requested from the U S Fish and Wildlife Service (FWS)

STATUS Endangered (35 FR 8495 June 2 1970) without critical habitat

DESCRIPTION A ladder backed 8 inch long woodpecker with a solid black cap and nape and prominent white cheek patches. The male has a tiny red streak behind the eye and near the ear (the cockade). Similar to the downy and hairy woodpeckers in general appearance but the red-cockaded woodpecker has a barred back spotted breast and the male has red on either side of head rather than on nape.

HABITAT Open old aged (60-70+ years) loblolly shortleaf and especially slash and longleaf pine woodlands rarely if ever in dense woodlands. Presence of old trees with heart rot are essential for roosting and nesting sites.

DISTRIBUTION Southeastern U S from North Carolina to Florida and west to eastern Texas

Present Southeastern U S pine forest from North Carolina to Florida west to Oklahoma and Texas

Historic Western edge of range formerly reached 34 counties in eastern Texas



THREATS AND REASONS FOR DECLINE

Decrease in the quality and quantity of old growth forest nesting habitat primarily due to short term rotation timber management on private and public forests and to fire suppression. Southern pine beetle infestations on National Forests have contributed to the decline of suitable red-cockaded woodpecker foraging and nesting habitat.

OTHER INFORMATION The Recovery Plan was revised in 1985. The 1991 Red-cockaded Woodpecker pre-breeding season population in Texas was 583 birds with 60% of these on the Sam Houston National Forest. The Interim Standards and Guidelines for Protection and Management of Red-cockaded Woodpecker Habitat within 3/4 mile of colony sites have been proposed for red-cockaded woodpecker management on National Forests. Similar guidelines for Red-cockaded Woodpecker habitat management on state and private lands are being developed. The red-cockaded woodpecker is a colonial cooperative breeder traveling in family groups (clans). The diet of the woodpecker consist mainly of insects (85%) but also includes small fruits and seeds (15%).

REFERENCES

- Ligon J D P B Stacey R N Conner C E Bock and C S Adkinson 1986 Report of the American Ornithologist Union Committee for the conservation of the Red-cockaded Woodpecker Auk 103 848 855
- Sweepston D 1980 Results of red-cockaded woodpecker research in Texas between 1969 and 1973 Species Report Texas Parks and Wildlife Department P R Project W 103 R 9
- Thompson R L (ed) 1971 Proceedings of ecology and management of the red-cockaded woodpecker Bureau Sport Fish and Wildlife and Tall Timbers Research Station Tallahassee FL
- U S Fish & Wildlife Service (USFWS) 1985 Red-cockaded Woodpecker Recovery Plan USFWS Endangered Species Office Atlanta GA

REV DATE 8/92

THE RED-COCKADED WOODPECKER

The red cockaded woodpecker (RCW) was once a common bird in the mature pine forests of the southeast. It lived from east Texas to Florida and north to Missouri and Maryland. Today its range and population have been reduced through loss of habitat. Much of the original piney woods of the southeast has been cleared for agriculture or contains immature timber. This bird was placed on the Endangered Species list in 1970. National Forest lands in east Texas presently support most of the known woodpecker colonies in the state.

The RCW has a unique habit of building roost and nest cavities in live southern pines. Other woodpeckers prefer dead snags. This habit is of great benefit to the dozens of other cavity dwelling animals that readily move in upon abandonment by the woodpecker.

The RCW lives in family groups called clans. A clan consists of the breeding male and female and possibly some helpers. The helpers are typically the sons of the breeding male and can be from 1 to 3 years old. Helpers assist with incubating eggs, feeding young, and excavating new cavities. The breeding male may live for several years. When he dies, one of his helper sons may inherit the status of breeding male.

The clan may have several cavity trees arranged in a cluster. The cluster of cavity trees and surrounding area is called the colony site. The clan requires a large area in which to forage for insects, spiders, etc. and may not be found in the colony site during the day. However, the clan always returns to the colony site in the evening to roost.

If you are patient, you may see a red-cockaded woodpecker in this colony site, especially around dawn or dusk. The RCW is a ladder-backed woodpecker, slightly larger than a bluebird. You will not notice any red on the head, as the name would imply. Red is found only on the male and only under the outer feathers behind the ear.

The best time of the year to observe this bird is in May or June, when nesting is taking place. During these months, birds may be observed within the colony site even during midday. Please do not disturb this endangered species, particularly during this critical period.

RED-COCKADED HABITAT

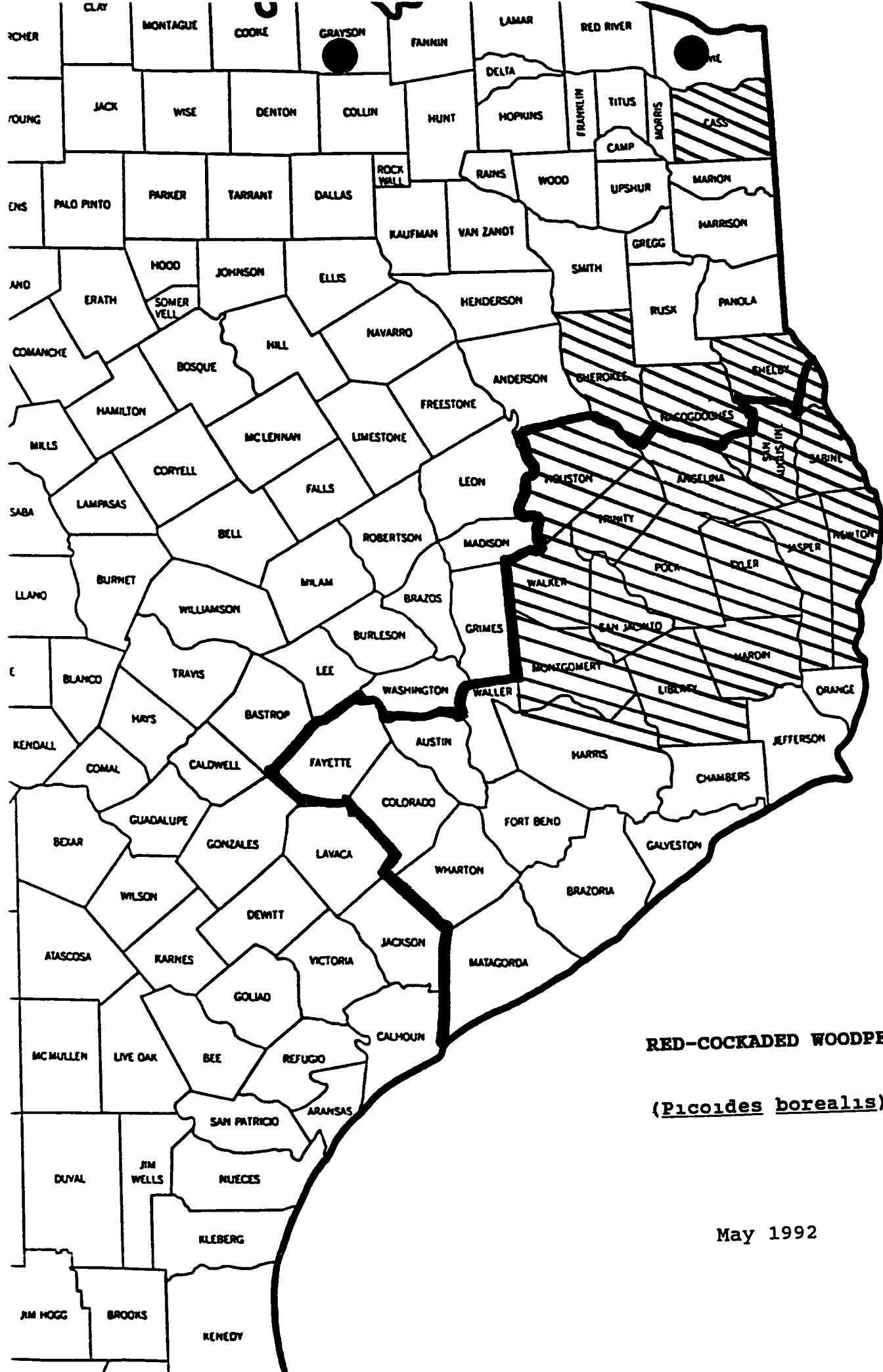


Figure 1 Red cockaded woodpecker

Red cockaded woodpecker cavities are excavated in live pine trees (figure 1). Cavity trees in open mature pine stands are preferred (figure 2). Heavy hardwood midstory tends to lead to colony site abandonment.



Figure 2 Colony site. Note other cavity in center back ground.



RED-COCKADED WOODPECKER

(Picoides borealis)

May 1992

REFERENCE 29

212

Leo M. Weinberg

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SOIL SURVEY OF Harris County, Texas



**United States Department of Agriculture
Soil Conservation Service**

In cooperation with the

**Texas Agricultural Experiment Station and the
Harris County Flood Control District**

of loose light gray sand that is slightly acid in the upper 25 inches and neutral in the lower 40 inches

The surface layer of the Kaman soils is about 39 inches thick. It is very firm neutral very dark gray clay in the upper part and very firm mildly alkaline black clay in the lower part. The layer below that is 13 inches thick and consists of very firm mildly alkaline dark gray clay that has slickensides. The next layer extending to a depth of 70 inches is very firm mildly alkaline dark gray clay and has a few yellowish brown mottles and calcium carbonate concretions.

The Hatliff soils are in positions on the landscape similar to those of the Nahatche Voss and Kaman soils. Hatliff soils have loamy and sandy layers. The Harris soils are clayey coastal marshland and are subject to inundation by water at high tide. The Ijam soils consist of clayey sediment dredged or pumped from the floor of rivers bayous bays or canals during the construction or maintenance of these waterways.

Most of this association is used for timber production woodland grazing pasture and wildlife habitat. It is not suitable for urban developments.

The soils are subject to flooding and in some areas where cover is lacking to soil removal by scouring.

Soil Maps for Detailed Planning

The kinds of soil (mapping units) shown on the detailed soil map at the back of this publication are described in this section. These descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production in planning land use and developing soil resources and in enhancing protecting and preserving the environment. More information for each soil is given in the section *Planning the Use and Management of the Soils*.

Preceding the name of each mapping unit is the symbol that identifies the unit on the detailed soil map. Each mapping unit description includes general facts about the soil and a brief description of the soil profile. The principal hazards and limitations are indicated and the management concerns and practices for the major uses are discussed.

A mapping unit represents an area on the landscape and consists of a dominant soil or soils for which the unit is named. Most mapping units have one dominant soil but some have two or more dominant soils. A mapping unit commonly includes small scattered areas of other soils. The properties of some of these soils can differ substantially from those of the dominant soil and thus greatly influence the use of the dominant soil.

In most areas surveyed there is land that has little or no identifiable soil and supports no vegetation. This land called miscellaneous land types is delineated on the map and given descriptive names. Urban land is an example. Areas too small to be delineated are identified by a special symbol on the soil map.

The acreage and proportionate extent of each mapping unit are given in table 2 and additional information on each unit is given in interpretive tables in other sections (see *Summary of Tables*). Many of the terms used in describing soils are defined in the Glossary.

Soil Descriptions

Ad—Addicks loam This is a nearly level soil in broad areas on the upland prairies. The areas are slightly higher on the landscape than those of the adjacent or surrounding soils. The surface is plane to slightly convex. The slope ranges from 0 to 1 percent but averages about 0.3 percent. Areas of this soil average several hundred acres in size and some areas are as large as several thousand acres.

The surface layer is friable neutral black loam about 11 inches thick. The layer below that is friable neutral dark gray loam about 12 inches thick. The next layer is about 26 inches thick and consists of friable moderately alkaline light gray loam that is about 20 percent by volume visible calcium carbonate. Below that is a layer of firm moderately alkaline light gray loam that has distinct yellow and yellowish brown mottles and is about 5 percent visible calcium carbonate.

Included with this soil in mapping are small areas of Clodine Bernard Midland and Gessner soils. Also included are a few areas of a soil that is similar to Addicks loam but is calcareous at the surface. A few areas are recently built up urban land.

This soil is used primarily for rice improved pasture and native pasture. A few small areas are used for corn grain sorghum and vegetables. The native vegetation consists of bluestem and panicum and some greenbrier and annual weeds. Improved pasture grasses are common bermudagrass and Coastal bermudagrass. Pine and hard woods have encroached in some areas.

This soil is poorly drained. It is saturated with water for short periods during the year. Surface runoff is slow. Internal drainage is slow and permeability is moderate. The available water capacity is high.

Drainage is the dominant concern in crop management. Proper fertilization and surface drainage increase crop and pasture production. Capability unit IIIw 1 rice group 2 pasture and hayland group 7C Loamy Prairie range site woodland suitability group 2w9 Tight Sandy Loam woodland grazing group.

Ak—Addicks Urban land complex This is a nearly level complex in urban areas and in the surrounding rural areas where the population is increasing. Encroachment of trees has occurred in some areas. The older urban areas are generally wooded as a result of tree planting to provide shade. The areas of this mapping unit are irregular in shape and generally range in size from 30 to 850 acres. A few areas are larger than a thousand acres. The boundaries commonly coincide with the outer limits of subdivisions and other built up areas. The surface is plane to slightly convex. The slope ranges from 0 to 1 percent and averages about 0.3 percent.

Addicks loam makes up 20 to 85 percent of the complex Urban land 10 to 60 percent and other soils 5 to 20 percent. The areas are so intricately mixed that it was not practical to separate them at the mapping scale for this survey.

The Addicks soil has a surface layer of friable neutral black loam about 11 inches thick. The layer below that is friable neutral dark gray loam about 12 inches thick. The next layer is about 26 inches thick and consists of friable moderately alkaline light gray loam that is about 20 percent by volume visible calcium carbonate. The layer at a depth of about 49 inches is firm moderately alkaline light gray loam that has distinct yellow and yellowish brown mottles and is about 5 percent visible calcium carbonate.

Urban land consists of soils that support buildings and other urban structures that have covered or altered the soils so that classification is not practical. Typical structures are single and multiple unit dwellings, streets, schools, churches, parking lots, office buildings, and shopping centers less than 40 acres in size. In places Urban land consists of small areas of Addicks loam that has been altered by cutting, filling, and grading. Fill material has altered the soil in places. In some areas the entire profile is covered with 6 to 24 inches of fill material. Soils in the older areas that are drained by road ditches show less evidence of alteration.

Included with this unit in mapping are a few areas of Clodine, Gessner, Bernard, and Midland soils. These soils are unaltered in places.

This mapping unit has moderate to severe limitations for urban development. Poor drainage is the greatest limitation. There are no limitations for landscaping or for gardening. Chlorosis is common in areas where cuts have been made. Most of the acreage was formerly in cropland or native pasture.

Am—Aldine very fine sandy loam. This is a nearly level soil in broad oblong and oval wooded areas. The surface is plane to slightly convex. The slope is 0 to 1 percent but averages about 0.6 percent. Areas of this soil average 200 acres but some are several hundred acres in size.

The surface layer is friable medium acid dark grayish brown very fine sandy loam about 5 inches thick. The layer below that is friable medium acid grayish brown very fine sandy loam about 5 inches thick. It tongues into a layer of friable very strongly acid yellowish brown loam about 9 inches thick. The next layer about 11 inches thick is firm very strongly acid gray clay that has mottles of yellowish brown and red. Below that extending to a depth of 60 inches is a layer of firm slightly acid light gray clay loam that is less mottled with depth.

Included in some mapped areas of this soil are small areas of Atasco, Bissonnet, Aris, Hockley, Segno, and Ozan soils. These soils make up less than 10 percent of any mapped area. Low sandy circular mounds are common in a few places. These rise 6 to 30 inches above the surface and are 15 to 50 feet in diameter.

This Aldine soil is used mainly for timber and woodland. The native vegetation is chiefly pine, hard woods, sedge, beaked panicum, longleaf, uniola, and little bluestem. Some small open or cleared areas are used as pasture or home gardens.

This soil is somewhat poorly drained. Surface runoff is slow and permeability is very slow. The available water capacity is high. This soil is saturated at a depth of 20 to 30 inches during cool months and in periods of excessive rainfall.

Cultivated areas of this soil are difficult to manage. Fertilizer, lime, and drainage systems are beneficial to pasture and row crops. Capability unit IIIw 1, rice group 2, pasture and hayland group 8A, woodland suitability group 2w9, Flatwoods woodland grazing group.

An—Aldine Urban land complex. This is a nearly level to gently sloping complex in metropolitan areas and in rural areas where the population is increasing. This mapping unit is of minor extent. Areas are irregular in shape and generally range from 30 to 250 acres in size. One area however covers 1,200 acres. Boundaries commonly coincide with the outer limits of subdivisions and built up areas. The slope is mainly 0 to 2 percent but ranges to 3 percent. In a few places along drainageways the slope is 5 percent. Native pine and hardwoods are common in most areas.

The Aldine soil makes up 25 to 75 percent of this complex. Urban land 10 to 70 percent and other soils 5 to 20 percent. The areas are so intricately mixed that it was not feasible to separate them at the mapping scale for this survey.

The surface layer of the Aldine soil is friable medium acid dark grayish brown very fine sandy loam about 5 inches thick. The layer below that is friable medium acid grayish brown very fine sandy loam about 5 inches thick. It tongues into a layer of friable very strongly acid yellowish brown loam about 9 inches thick. The next layer about 11 inches thick is firm very strongly acid gray clay that has mottles of yellowish brown and red. Below that extending to a depth of 60 inches is a layer of firm slightly acid light gray clay loam that has less mottles with depth.

Urban land consists of soils that have been altered or obscured by buildings and other urban structures making their classification impractical. Typical structures are single multiple unit dwellings, garages, sidewalks, patios, driveways, streets, schools, churches, shopping centers, office buildings, paved parking lots, and industrial parks. Included with Urban land in mapping are small areas of the Aldine soil that have been altered by cutting, filling, and grading. In places 6 to 24 inches of fill material has been added to improve drainage.

Included with this unit in mapping are a few areas of Atasco, Bissonnet, Aris, Hockley, Segno, Vamont, and Ozan soils. These soils are unaltered in places.

This mapping unit has moderate to severe limitations for urban development. It has severe limitations for use as septic tank filter fields because the clayey subsoil is

REFERENCE 30

CENSUS '90



1990 Census of
Population and Housing
Summary Population and
Housing Characteristics

Texas

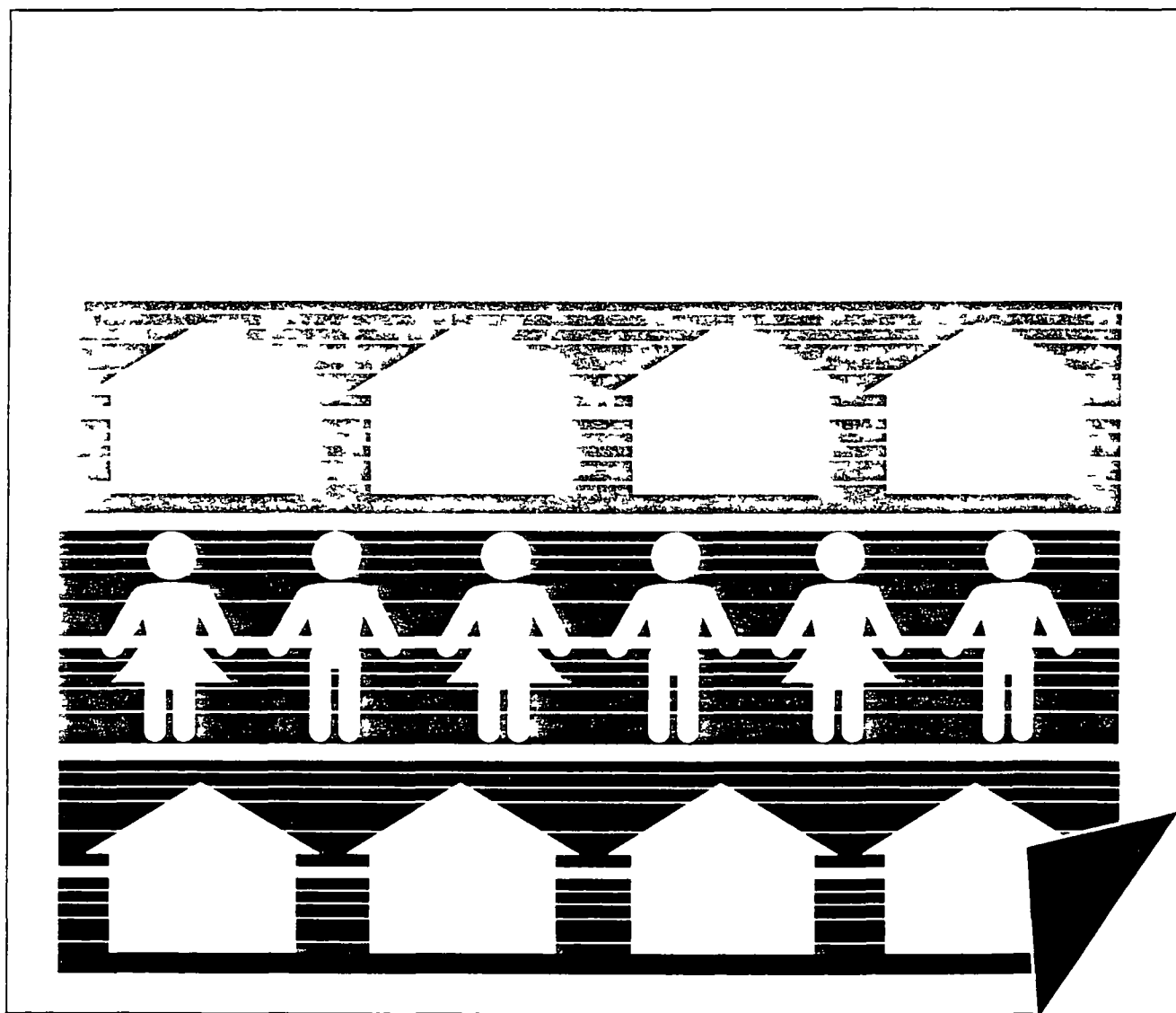


Table 10. Occupancy and Financial Characteristics for Owner-Occupied Housing Units: 1990 —Con

[For definitions of terms and meanings of symbols see text]

State County Place and [In Selected States] County Subdivision	All owner-occupied housing units				Specified owner-occupied housing units									
	Total	1 unit, detached or attached	Persons per unit	Mean number of rooms	Total	Value								
						Less than \$50,000	\$50,000 to \$99,999	\$100,000 to \$149,999	\$150,000 to \$199,999	\$200,000 to \$299,999	\$300,000 or more	Lower quartile (dollars)	Median (dollars)	Upper quartile (dollars)
PLACE AND COUNTY SUBDIVISION—														
Con														
Grayburg city, Hardin County	78	60	2.83	5.7	51	44	6	—	1	—	—	15 000	31 300	43 800
Grays Prairie village, Kaufman County	71	46	2.80	5.4	23	10	7	5	1	—	—	41 900	55 000	103 100
Greenville city, Hunt County	5 042	4 878	2.63	5.8	4 556	2 356	1 852	255	65	21	7	28 500	48 300	72 100
Gregory city, San Patricio County	470	431	3.70	5.1	410	364	45	1	—	—	—	20 400	30 300	40 700
Grey Forest city, Bexar County	129	125	2.56	5.6	108	19	64	15	7	3	—	56 200	74 300	98 200
Groesbeck city, Limestone County	821	742	2.42	5.5	686	440	221	21	3	1	—	24 000	38 600	59 600
Groom city, Carson County	203	182	2.36	6.0	177	124	52	1	—	—	—	17 800	35 500	53 400
Groves city, Jefferson County	4 711	4 630	2.63	5.6	4 382	2 822	1 449	86	15	6	4	33 500	43 000	57 500
Groveton city, Trinity County	298	248	2.32	5.5	230	196	30	3	1	—	—	17 000	26 500	41 900
Gruver city, Hansford County	334	302	2.61	6.0	291	152	112	23	4	—	—	30 500	48 100	74 400
Gun Barrel City town, Henderson County	1 216	797	2.35	4.9	738	286	346	73	28	5	—	38 700	60 500	84 800
Gunter town, Grayson County	177	152	2.60	5.4	142	92	47	3	—	—	—	29 300	38 900	55 800
Gustine town, Comanche County	140	125	2.26	5.1	110	89	21	—	—	—	—	16 300	25 000	45 400
Hackberry town, Denton County	53	13	2.81	4.8	13	8	5	—	—	—	—	33 800	46 300	58 800
Hale Center city, Hale County	506	455	2.67	5.2	441	336	93	11	1	—	—	16 200	29 800	48 800
Hallettsville city, Lavaca County	719	632	2.30	5.6	575	348	196	24	5	2	—	28 100	42 700	63 000
Hallsburg city, McLennan County	134	106	2.89	5.6	57	27	23	4	3	—	—	33 500	53 000	79 900
Hallsville city, Harrison County	557	511	2.97	5.7	476	208	240	24	3	—	1	41 000	52 100	61 700
Haham City city, Tarrant County	7 550	6 967	2.66	5.5	6 561	2 937	3 370	186	44	20	4	42 000	52 300	65 700
Hamilton city, Hamilton County	959	892	2.17	5.4	809	622	171	14	2	—	—	19 500	32 200	48 200
Hamlin city	855	780	2.51	5.4	746	577	147	19	3	—	—	15 000	24 300	45 800
Fisher County	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Jones County	855	780	2.51	5.4	746	577	147	19	3	—	—	15 000	24 300	45 800
Happy town	183	161	2.41	5.5	153	133	20	—	—	—	—	15 700	29 100	41 300
Randall County	11	7	3.36	5.7	6	5	1	—	—	—	—	27 500	32 500	37 500
Swisher County	172	154	2.35	5.5	147	128	19	—	—	—	—	15 300	28 200	41 400
Hardin town, Liberty County	156	125	2.61	5.5	108	66	39	3	—	—	—	26 900	43 800	60 000
Marker Heights city, Bell County	2 494	1 826	2.85	6.0	1 719	259	886	474	69	27	4	61 600	85 000	111 700
Harington city, Cameron County	9 085	8 092	3.14	5.4	7 641	4 598	2 497	352	113	61	20	29 100	42 700	64 100
Hart city, Castro County	242	202	3.30	5.3	192	138	50	2	2	—	—	20 800	36 300	53 500
Haskell city, Haskell County	1 024	972	2.32	5.5	903	698	187	16	2	—	—	16 600	30 000	47 800
Hazlet city	227	223	3.07	6.4	195	15	44	89	27	14	6	91 200	119 600	148 900
Denton County	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tarrant County	227	223	3.07	6.4	195	15	44	89	27	14	6	91 200	119 600	148 900
Hawkins city, Wood County	353	305	2.53	5.6	280	161	105	12	2	—	—	29 600	44 500	65 500
Howley city, Jones County	184	146	2.73	5.4	121	104	16	1	—	—	—	20 200	32 000	41 600
Hays city, Hays County	72	72	3.07	6.0	66	14	50	2	—	—	—	52 300	64 800	74 700
Hearne city, Robertson County	1 152	1 056	2.71	5.6	994	707	256	20	7	2	2	23 200	36 300	53 900
Heath city, Rockwall County	645	640	2.91	7.2	581	17	165	126	80	107	86	91 600	140 900	242 600
Hebburnville CDP, Jim Hogg County	1 148	991	3.01	5.2	932	743	167	20	1	1	—	15 700	28 200	45 200
Hebron town, Denton County	302	287	2.80	7.0	275	—	48	198	16	6	7	104 000	117 200	135 400
Hedley town, Donley County	142	129	2.20	5.3	117	111	5	1	—	—	—	15 000	15 000	25 600
Hedwig Village city, Harris County	615	525	2.65	7.8	491	6	4	17	67	160	237	220 000	295 200	392 100
Helotes city, Bexar County	501	489	2.80	7.1	442	11	108	146	103	64	10	97 200	134 100	178 800
Hemphill city, Sabine County	305	238	2.32	5.5	225	168	49	6	2	—	—	20 100	32 400	50 500
Hempstead city, Waller County	866	755	2.54	5.4	697	446	229	17	3	1	1	24 100	38 900	59 800
Henderson city, Rusk County	2 952	2 845	2.47	5.8	2 618	1 549	892	111	33	19	14	28 700	43 700	65 400
Hennetta city, Clay County	939	876	2.39	5.6	830	620	190	17	3	—	—	21 800	34 800	50 300
Hereford city, Deaf Smith County	3 175	2 890	3.00	5.5	2 725	1 672	917	102	25	7	2	29 000	42 100	62 200
Hewitt city, McLennan County	1 919	1 873	3.06	5.9	1 768	138	551	78	—	1	—	59 400	68 000	79 100
Hickory Creek town, Denton County	578	552	2.88	6.5	527	36	283	173	26	6	3	76 200	93 000	116 700
Hico city, Hamilton County	394	361	2.23	5.4	320	262	55	2	1	—	—	22 100	33 800	46 800
Hidalgo city, Hidalgo County	410	353	4.23	5.0	333	236	81	13	1	2	—	22 100	38 700	54 000
Higgins city, Lipscomb County	164	145	2.35	5.7	138	96	37	5	—	—	—	15 000	26 000	54 700
Highland Park town, Dallas County	2 601	2 486	2.60	8.3	2 329	5	20	48	115	352	1 789	311 100	483 600	500 000+
Highlands CDP, Harris County	1 841	1 467	2.81	5.5	1 376	722	612	32	9	—	1	35 800	48 600	64 100
Highland Village city, Denton County	2 073	2 063	3.24	7.5	1 962	4	330	1 015	414	162	37	107 700	131 700	161 100
Hill Country Village city, Bexar County	322	312	3.06	8.1	275	5	6	14	28	67	155	227 200	327 300	455 600
Hillcrest village, Brazoria County	225	225	2.77	7.1	216	5	152	46	11	—	—	21 700	86 400	104 000
Hillsboro city, Hill County	1 697	1 613	2.37	5.8	1 487	995	412	55	13	9	3	20 800	36 400	58 300
Hilshire Village city, Harris County	252	252	2.44	7.6	236	—	9	47	78	66	36	151 600	186 700	252 100
Hitchcock city, Galveston County	1 569	1 386	2.68	5.6	1 298	841	410	33	6	6	2	30 100	41 300	57 000
Holiday Lakes town, Brazoria County	297	149	3.08	4.5	146	135	10	—	1	—	—	18 200	25 800	35 200
Holland town, Bell County	246	214	2.84	5.3	204	165	37	1	—	—	1	19 500	31 900	46 000
Holladay city, Archer County	431	378	2.68	5.4	354	228	100	20	5	—	1	23 400	40 200	59 600
Hollywood Park town, Bexar County	1 038	1 033	2.56	7.4	946	4	209	477	167	66	23	102 400	126 100	154 800
Homestead Meadows CDP, El Paso County	1 111	443	4.15	4.6	418	289	92	21	10	5	1	24 700	37 800	57 700
Hondo city, Medina County	1 434	1 204	2.96	5.3	1 128	710	351	52	5	7	3	23 200	40 800	63 800
Honey Grove city, Fannin County	502	463	2.26	5.6	430	316	102	8	3	1	—	19 400	32 900	51 500
Hocks city, Bowie County	789	612	2.52	5.3	578	388	185	2	2	1	—	26 600	40 000	56 100
Horizon City town, El Paso County	692	682	2.63	6.5	645	67	507	59	10	1	1	57 400	68 900	86 200
Horseshoe Bay CDP	593	551	2.03	6.0	497	24	122	74	102	104	71	91 800	163 000	240 300
Burnet County	103	83	2.37	5.8	66	12	23	5	10	7	9	61 900	93 800	

Table 16. Land Area and Population Density: 1990—Con

(For definitions of terms and meanings of symbols, see text)

State County Place and [In Selected States] County Subdivision	All persons	Land area		Persons per—		State County Place and [In Selected States] County Subdivision	All persons	Land area		Persons per—	
		Square kilo- meters	Square miles	Square kilo- meter	Square mile			Square kilo- meters	Square miles	Square kilo- meter	Square mile
PLACE AND COUNTY SUBDIVISION— Con						PLACE AND COUNTY SUBDIVISION— Con					
Fort Worth city	447 619	728 0	281 1	614 9	1 592 4	Grey Forest city Bexar County	425	1 9	7	223 7	607 1
Denton County	—	9 7	3 7	—	—	Groesbeck city Limestone County	3 185	8 5	3 3	374 7	965 2
Tarrant County	447 619	718 3	277 3	623 2	1 614 2	Groom city Carson County	613	2 0	8	306 5	766 3
Franklin city Robertson County	1 336	2 4	9	556 7	1 484 4	Groves city Jefferson County	16 513	13 5	5 2	1 223 2	3 175 6
Frankston town Anderson County	1 127	6 4	2 5	176 1	450 8	Groveton city Tarrant County	1 071	6 6	2 6	162 3	411 9
Fredericksburg city, Gillespie County	6 934	10 6	4 1	654 2	1 691 2	Gruver city Hamford County	1 172	2 8	1 1	418 6	1 065 5
Freeport city, Brazoria County	11 389	29 7	11 5	383 5	990 3	Gun Barrel City town Henderson County	3 526	10 3	4 0	342 3	881 5
Freer city Duval County	3 271	10 4	4 0	314 5	817 8	Gunter town Grayson County	898	3 9	1 5	230 3	598 7
Fresno CDP Fort Bend County	3 182	22 5	8 7	141 4	365 7	Gustine town Comanche County	430	2 4	9	179 2	477 8
Friendswood city	22 814	53 7	20 7	424 8	1 102 1	Hackberry town Denton County	200	9	3	222 2	666 7
Galveston County	14 979	42 3	16 3	354 1	919 0	Hale Center city Hale County	2 067	2 8	1 1	738 2	1 879 1
Harris County	7 835	11 4	4 4	687 3	1 780 7	Hallettsville city, Lavaca County	2 718	5 7	2 2	476 8	1 235 5
Floma city, Parker County	3 688	3 4	1 3	1 084 7	2 836 9	Haltersburg city, McLennan County	450	21 8	8 4	20 6	53 6
Flaca city	6 141	88 5	34 2	69 4	179 6	Haltersville city, Harrison County	2 288	5 8	2 2	394 5	1 040 0
Collin County	5 873	66 6	25 7	88 2	228 5	Haltom city Tarrant County	32 856	32 0	12 3	1 026 8	2 671 2
Denton County	268	21 9	8 5	12 2	31 5	Hamilton city Hamilton County	2 937	6 7	2 6	438 4	1 129 6
Fritch city	2 335	3 1	1 2	753 2	1 945 8	Hamlin city	2 791	13 8	5 3	202 2	526 6
Hutchinson County	2 325	3 1	1 2	750 0	1 937 5	Fisher County	3	2 3	9	1 3	3 3
Moore County	10	—	—	—	—	Jones County	2 788	11 4	4 4	244 6	633 6
Frost town, Navarro County	579	2 9	1 1	199 7	526 4	Happy town	588	2 8	1 1	210 0	534 5
Frutshard city Van Zandt County	349	4 6	1 8	75 9	193 9	Randall County	37	1	—	370 0	—
Fulshear city Fort Bend County	557	21 1	8 2	26 4	67 9	Sawsher County	551	2 7	1 0	204 1	551 0
Fulton town, Arkansas County	763	1 7	7	448 8	1 090 0	Hardin town, Liberty County	563	5 7	2 2	98 8	255 9
Gainesville city Cooke County	14 256	34 9	13 5	408 5	1 056 0	Harker Heights city Bell County	12 841	29 6	11 4	433 8	1 126 4
Galena Park city Harris County	10 033	12 9	5 0	777 8	2 006 6	Hartington city Cameron County	48 735	69 7	26 9	699 2	1 811 7
Gallatin city Cherokee County	368	11 9	4 6	30 9	80 0	Hart city Castro County	1 221	2 0	8	610 5	1 526 3
Galveston city Galveston County	59 070	119 6	46 2	493 9	1 278 6	Haskell city Haskell County	3 362	8 8	3 4	382 0	988 8
Ganado town Jackson County	1 701	2 9	1 1	586 6	1 546 4	Haskell city	795	12 6	4 8	63 1	165 6
Gardendale CDP Ector County	1 103	18 2	7 0	60 6	157 6	Denton County	—	1	—	—	—
Garden Ridge city, Comal County	1 450	18 4	7 1	78 8	204 2	Tarrant County	795	12 4	4 8	64 1	165 4
Garfield CDP	1 336	36 4	14 0	36 7	95 4	Hawkins city Wood County	1 309	5 8	2 2	225 7	595 0
Basstrap County	103	9	4	114 4	257 5	Hawley city Jones County	606	7 6	2 9	79 7	209 0
Travis County	1 233	35 4	13 7	34 8	90 0	Hays city Hays County	251	4	2	627 5	1 255 0
Garland city	180 650	148 5	57 3	1 216 5	3 152 7	Heame city Robertson County	5 182	10 6	4 1	484 2	1 251 7
Collin County	15	1 5	6	10 0	25 0	Heath city Rockwall County	2 108	17 1	6 6	124 3	319 4
Dallas County	180 635	146 9	56 7	1 229 6	3 185 8	Hebberville CDP Jim Hogg County	4 465	14 9	5 7	299 7	783 9
Rockwall County	—	—	—	—	—	Hebron town, Denton County	1 128	17 7	6 8	63 7	165 9
Garrett town, Ellis County	340	9	3	377 8	1 133 3	Hebroy town, Donley County	3 391	19 7	7	205 8	588 6
Garrison town, Nogaloches County	883	3 0	1 2	294 3	735 8	Hebwing Village city Harris County	2 616	22 9	9	1 189 1	2 904 7
Gary City town, Panoia County	271	4 9	1 9	55 3	142 6	Helotes city Bexar County	1 535	6 8	2 6	225 7	590 4
Gatesville city Coryell County	11 492	21 3	8 2	539 5	1 401 5	Hempshall city, Sabine County	1 182	10 4	4 0	23 1	513 4
Georgetown city Williamson County	14 842	34 8	13 5	426 5	1 099 4	Hempstead city Waller County	3 551	10 4	2 3	341 4	887 7
George West city Live Oak County	2 586	4 9	1 9	527 8	1 361 1	Henderson city Rusk County	11 139	28 3	10 9	393 6	1 021 3
Gholston city McLennan County	4 692	30 4	11 7	22 8	59 1	Hennetta city Clay County	2 896	11 0	4 2	263 3	689 3
Giddings city Lee County	4 093	13 3	5 1	307 7	802 5	Hereford city Deaf Smith County	14 745	14 5	5 6	1 016 9	2 633 0
Gilmer city, Upshur County	4 822	10 2	3 9	472 7	1 236 4	Hewitt city McLennan County	8 983	17 6	6 8	510 4	1 321 0
Gladewater city	6 027	30 4	11 7	198 3	515 1	Hickory Creek town Denton County	1 893	11 7	4 5	161 8	420 7
Gregg County	3 747	19 1	7 4	196 2	506 4	Hico city Hamilton County	1 342	3 8	1 5	353 2	894 7
Upshur County	2 280	11 3	4 4	201 8	518 2	Hidalgo city Hidalgo County	3 292	9 0	3 5	365 8	940 0
Glenn Heights city	4 564	18 1	7 0	252 2	652 0	Higgins city Lipscomb County	464	2 8	1 1	165 7	421 3
Dallas County	3 768	12 4	4 8	303 9	785 0	Highland Park town, Dallas County	8 739	5 8	2 2	1 506 7	3 972 2
Ellis County	796	5 7	2 2	139 6	361 8	Highlands CDP Harris County	6 632	16 0	6 2	414 5	1 069 7
Glen Rose city Somervell County	1 949	5 6	2 2	348 0	885 9	Highland Village city Denton County	7 027	10 8	4 2	650 6	1 673 4
Godley town Johnson County	569	18 7	7	316 1	812 9	Hill Country Village city Bexar County	1 038	5 6	2 2	185 4	471 0
Goldsmith city Ector County	297	8	3	371 3	990 0	Hillcrest village Brazoria County	695	1 1	4	631 8	1 627 3
Goldthwaite city Mills County	1 658	3 9	1 5	425 1	1 105 3	Hillsboro city Hill County	7 072	21 5	8 3	328 9	852 9
Goliad city Goliad County	1 946	3 9	1 5	499 0	1 297 3	Hilshire Village city Harris County	665	7	3	950 0	2 216 7
Golinda city	347	10 5	4 0	33 0	86 8	Hitchcock city Galveston County	5 868	86 8	33 5	61 6	1 039 6
Falls County	289	7 9	3 1	36 6	93 2	Holiday Lakes town Brazoria County	1 039	2 5	1 0	475 6	1 039 6
McLennan County	58	2 5	1 0	23 2	58 0	Holland town Bell County	1 118	4 6	1 8	243 0	621 5
Gonzales city, Gonzales County	6 527	9 0	3 5	725 2	1 864 9	Holliday city, Archer County	1 475	5 1	2 0	289 2	734 2
Goodlow city Navarro County	319	2 7	1 0	118 1	319 0	Hollywood Park town Bexar County	2 841	3 8	1 5	747 6	1 894 4
Goodrich city Polk County	239	1 8	7	132 8	341 4	Homestead Meadows CDP, El Paso County	4 978	51 2	19 8	97 2	251 4
Gordon city Palo Pinto County	465	2 5	1 0	186 0	465 0	Hondo city Medina County	6 018	23 9	9 2	251 8	654 3
Goree city Knox County	412	3 8	1 5	108 4	274 7	Honey Grove city Fannin County	1 681	5 9	2 3	284 9	730 3
Gorman city Eastland County	1 290	4 3	1 6	300 0	806 3	Hooks city Bowie County	2 684	5 3	2 0	506 4	1 342 7
Grafton city, Palo Pinto County	561	1 8	7	311 7	801 4	Horizon City town El Paso County	2 308	10 9	4 2	211 7	549 7
Graham city Young County	8 986	14 2	5 5	632 8	1 633 8	Horzeshoe Bay CDP	1 546	60 6	23 4	25 5	66 0
Granbury city Hood County	4 045	9 7	3 7	417 0	1 093 2	Burnet County	324	28 3	10 9	11 4	29 4
Grandfalls town, Ward County	583	1 4	5	416 4	1 166 0	Llano County	1 222	32 3	12 5	37 8	97 6
Grand Prairie city	99 616	177 4	68 5	561 5	1 454 2	Houston city	1 630 553	1 398 3	539 9	1 166 1	3 020 7
Dallas County	81 527	121 3	46 8	672 1	1 742 0	Fort Bend County	27 027	28 8	1 1	938 4	2 434 2
Ellis County	3	1 8	7	1 7	4 3	Harris County	1 603 524	1 365 1	527 1	1 174 7	3 042 2
Tarrant County	18 086	54 2	20 9	333 7	865 4	Montgomery County	2	4 4	1 7	5	—
Grand Saline city Van Zandt County	2 630	5 0	1 9	526 0	1 384 2	Howardack city Donley County	211	4 7	1 8	44 9	117 2
Grandview city Johnson County	1 245	4 2	1 6	296 4	778 1	Hows town Grayson County	2 173	9 1	3 5	238 8	630 3
Granger city Williamson County	1 190	1 7	7	700 0	1 700 0	Hubbard city Hill County	1 589	5 1	2 0	311 6	794 4
Granite Shoals city Burnet County	1 378	6 0	2 3	229 7	599 1	Hudson city Angelina County	2 374	11 5	4 4	206 4	539 3
Grapeland city, Houston County	1 450	3 6	1 4	402 8	1 035 7	Hudson Oaks town Parker County	711	4 6	1 8	154 6	393 4
Grapevine city	29 202	81 0	31 3	360 5	933 0	Hughes Springs city	1 938	6 0	2 3	323 0	841 3
Dallas County	3	1 7	7	1 8	4 3	Cass County	1 927	5 9	2 3	326 6	807 7
Denton County	—	—	—	—	—	Morris County	11	1	—	110 0	—
Tarrant County	29 199	79 0	30 5	369 6	957 3	Humble city, Harris County	12 060	25 5	9 9	472 9	1 251 7
Grayburg city Hardin County	257	7 0	2 7	36 7	95 2	Hunters Creek Village city, Harris County	3 954	5 0	1 9	790 8	2 051 3
Greys Prairie village Kaufman County	286	3 3	1 3	86 7	220 0	Huntington city Angelina County	1 794	7 1	2 7	252 7	644 4
Greenville city, Hunt County	23 071	61 6	23 8	374 5	969 4	Huntsville city Walker County	27 925	54 3	21 0	514 3	1 339 7
Gregory city San Patricio County	2 458	3 4	1 3	722 9	1 890 8	Hurst city Tarrant County	33 574	25 6	9 9	1 311 5	3 391 3
						Hutchins city Dallas County	2 719	22 0	8 5	123 6	319 3
						Hutto town Williamson County	630	2 2	9	284 4	700 2
						Huxley city, Shelby County	335	5 1	2 0	65 7	167 3
						Idolado town, Lubbock County	2 075	2 5	1 0	829 6	2 074 4

REFERENCE 31

**CARD/BLANC CARTER
GEMS DATA**

COVERAGE

<u>STATE</u>	<u>COUNTY</u>	<u>STATE NAME</u>	<u>COUNTY NAME</u>
48	201	Texas	Harris Co

CENTER POINT AT STATE 48 Texas
COUNTY 291 Liberty Co

REGION OF THE COUNTRY

Zipcode found 77037 at a distance of 2 2 Km

<u>STATE</u>	<u>CITY NAME</u>	<u>FIPSCODE</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
TX	HOUSTON	48201	29 9083	95 3667

CENSUS DATA

CARD/BLANC CARTER

LATITUDE 29 53 19 LONGITUDE 95 21 54 1990 POPULATION

KM	0 00 400	400- 810	810-1 60	1 60 3 20	3 20-4 80	4 80-6 40	TOTALS
S 1	0	0	6251	29807	56767	72256	165081

STAR STATION

WBAN NO	STATION NAME	LAT	PERIOD OF LONG	DISTANCE RECORD	(km)
12960	HOUSTON/INTCONT TX	29 9833	95 3667	1981-1985	10 5
12918	HOUSTON/HOBBY TX	29 6500	95 2833	1964-1968	27 7
12906	HOUSTON/ELLINGTON TX	29 6167	95 1667	1966-1970	35 8
12923	GALVESTON/SCHOLES TX	29 2667	94 8667	1956-1960	84 2
12917	PRT ARTHUR/JEFFERSON CO TX	29 9500	94 0167	1981-1985	130 0
93987	LUFKIN/ANGELINA CO TX	31 2333	94 7500	1967-1971	160 6
12912	VICTORIA/FOSTER TX	28 8500	96 9167	1965-1974	189 4

U.S. SOIL DATA

STATE TEXAS

LATITUDE 29 53 19 LONGITUDE 95 21 54
THE STATION IS INSIDE H U 12040104

GROUND WATER ZONE 10

RUNOFF SOIL TYPE 1

EROSION 1 1210E-03 CM/MONTH

DEPTH TO GROUND WATER BETWEEN 3 0480E+02 AND 1 5240E+03

FIELD CAPACITY FOR TOP SOIL 6 0000E-02

EFFECTIVE POROSITY BETWEEN 2 0000E-02 AND 3 0000E-01

SEEPAGE TO GROUNDWATER BETWEEN 4 6330E+03 AND 1 3900E+04 CM/MONTH

DISTANCE TO DRINKING WELL 2 8000E+04 CM